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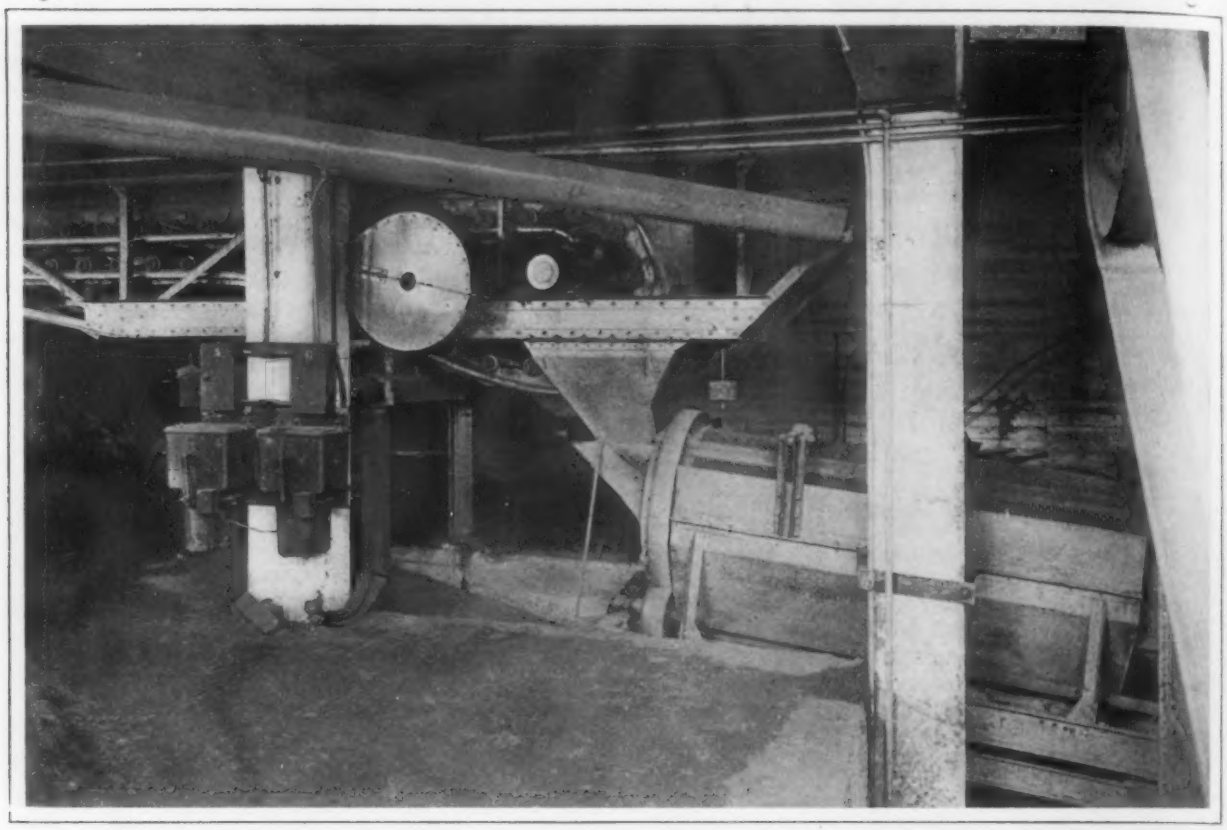
A Continuous Foundry for Small Castings

Striking and Original Mechanical Equipment of the Westinghouse Electric & Mfg. Company's Cleveland Plant for Handling Hot Metal, Sand and Castings

THE Westinghouse Electric & Mfg. Company has just completed a new foundry for light work in Cleveland, Ohio, that, with its general arrangement, its complete equipment for handling hot metal and sand and the castings from the time they leave the molds until they are finished and ready for shipment, is one of the most interesting foundry plants in the country This company formerly operated a heavy shop in Cleveland and a foundry for light castings in Allegheny, Pa. Some time ago it decided to remove the Allegheny plant to Cleveland and combine the two foundries. This necessitated a large extension to the plant as well as the remodeling and rearrangement of the old foundry. As the plant exists today it is virtually two foundries under one roof, with melting units widely separated, one a heavy shop and the other a light shop, the combined plants making one of the largest foundries in the country.

A distinctive feature of the light foundry is that a portion of it is operated as a continuous foundry, the remainder according to more general foundry practices. The whole foundry is now about equally divided between light and heavy work. The output includes a great variety of castings and an immense production of small castings. The production ranges from large pit and loam work for massive turbo-generator and motor frames, weighing up to 40 tons and down to small electrical parts, ranging from 3 to 4 lb. down to 2 oz. in weight, the smaller castings being such parts as small motor frames and castings for other small electrical apparatus, such parts as resis-

Fig. 1.—The Continuous Foundry Bay, Showing the Sand Chutes, the Rail Protected Walk Along the Overhead Sand Conveyors, the Electric Trolley Hoist for Handling Hot Metal and Castings and the Gratings Over Which the Molds Are Shaken Out



The Discharge End of the Used Sand Conveyor in the Basement and the Screen Through Which It Passes On Its Way to the Bucket Elevator

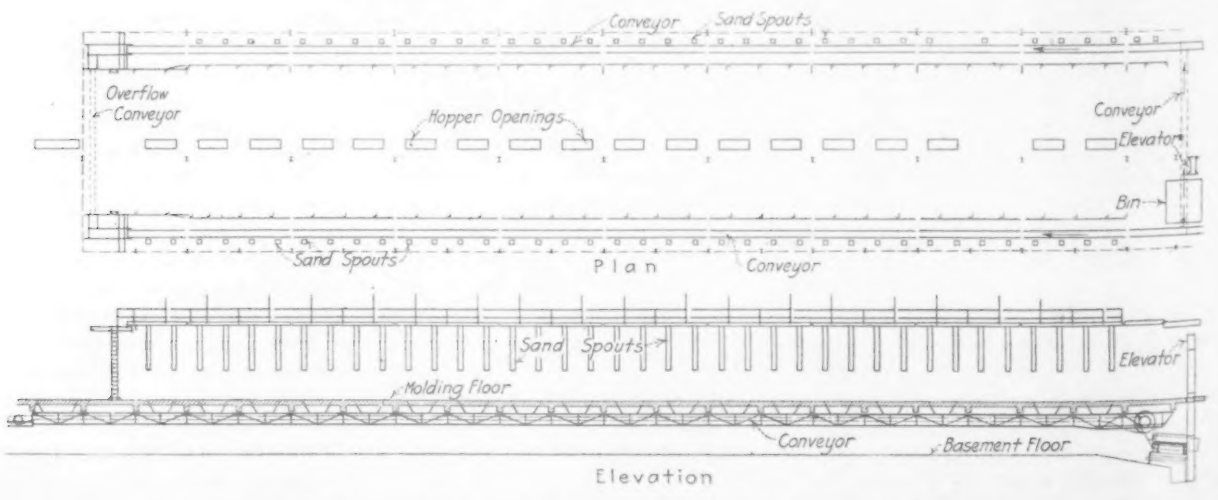
tance grids, watt meters and parts for switchboards, transformers and automobile starting devices.

The plant is composed of seven bays, four new bays for light work, including the continuous bay, and three old bays, where heavy castings are made. The new section is approximately 200 ft. wide and 290 ft. deep and the old part is 160 ft. wide and approximately 300 ft. deep, the depth of the old bays varying somewhat. The total floor space is approximately 108,000 sq. ft. The average melt per day is 140 tons. This article deals with the new light foundry, but more particularly with the continuous section of that foundry.

THE CONTINUOUS FOUNDRY SECTION

The continuous bay, shown in an illustration, is 295 ft. long by 52 ft. wide. Under this is a basement providing space for a portion of the sand-handling equipment and for sand storage. The continuous foundry floor is of concrete, over-laid with brick. The molds are made on drop plate molding machines arranged in two rows on each side of the shop. The machines are made by the Pridmore, Osborne and Federal Foundry Supply companies. These are used with or without hand strippers, depending upon the pattern. Molds are poured near the machines, sufficient floor space being provided for this purpose back of the machines, and they are poured and shaken out about as fast as made. They are shaken out over a narrow grating in the center of the floor, an operation constituting one of the largest and most complete foundry sand-handling plants in the country.

The sand falls through the gratings to a steel pan conveyor 20 in. wide that runs the greater part of the length of the bay in the basement directly under the foundry floor, a distance of about 250 ft. This conveyor is driven by a 10-h.p. motor at a speed of 24 ft. per min. This conveyor delivers the used sand to a revolving screen or riddle, 10 ft. long and



Scheme of the Floor and Overhead Sand Conveyors of the Continuous Foundry Bay

36 in. in diameter located in a pit, through which it is screened. The tailings are deposited on a short wooden flight elevator, which discharges them into a corner of the basement. New sand is added as needed by shoveling it into a chute at the side of the riddle. An illustration shows one end of the used sand conveyor in the basement and the screen through which it passes.

A DISINTEGRATOR AS A SAND MIXER

The screened sand is discharged into chutes onto a belt conveyor under the screen and from that to a bucket conveyor that elevates it to the top of a tower, a distance of 74 ft., this conveyor being driven by a 15-hp. motor, direct connected through cut gears. The elevator discharges the sand into a revolving screen 8 ft. long and 48 in. in diameter, operated by a chain drive from the elevator countershaft. From this riddle the sand goes into a disintegrator that takes the place of a mixer, and while passing through the chute conveying it to the disintegrator it is moistened by being sprayed with water under air pressure. The disintegrator is a revolving cage, 54 in. in diameter, driven at the high speed of 430 r.p.m. by a 15-hp. motor, the sand being cut and mixed by being thrown through a 1½-in. space between bars around the outer circumference. This disintegrator has been used in connection with other material, but this is its first installation for mixing foundry sand.

From the disintegrator the sand falls to a 40-ton steel storage tank. As it leaves the tank it is given a final cutting by means of zigzag tank feeders or cutters made up of narrow flat bars with a 1½-in. space between them, fixed at one end and moving back and forth at the opposite end, a distance of 7 in. These bars in their reciprocating motion shear off the sand, not only giving it a final mixing, but preventing clogging in the bottom of the tank. The feeders are driven by an eccentric, driven from the foot shaft of the feeder belt conveyors.

From the tank the prepared sand passes through the feeders and on two short transverse belt conveyors that in turn deliver it to two 18-in. plain belt conveyors that extend the length of the bay, one on each side about 20 ft. above the foundry floor. The latter conveyors move at a speed of 60 ft. per min., driven by a 10-h. p. motor, direct connected through cut gears. Under these overhead belt conveyors are steel chutes, 37 on each side and spaced 6 ft. apart, that extend down over the molding machines. Above each chute is an adjustable plow fixed at an angle for pushing the sand from the belt into the chute. When the handle of the plow is pulled down the plow blade is in contact with the surface of the belt and all the sand passes into that chute until the plow is raised. A man stationed on a narrow platform alongside the conveyor is employed in keeping each row of chutes filled with sand. The chutes are 12 x 15 in. in size. The sand is delivered direct to a flask ready for use by opening the gate at the bottom of the chute, which is operated by a lever within easy reach of the molder. At present the molders do their own pouring, but as soon as the organization is completed separate pouring gangs will be employed and the molders will only make their molds.

At the end of the overhead conveyor near the end of the continuous floor the sand left on the conveyor falls upon a transverse conveyor that carries it to a chute, through which the overflow falls to the

The Three Methods Employed for Handling Metal and Castings—an Overhead Traveling Crane, Electric Traveling Hoist and Electric Locomotive

conveyor belt under the foundry floor. This chute is provided with gates on each side, through which the sand is diverted to the foundry floor or directly into wheelbarrows for use by a few molders at that end of the floor not supplied by overhead chutes or as needed around the foundry floor. The sand conveyor system has a capacity of about 60 tons per hour, but at the present about 40 tons per hour is being used.

The foundry sand is unloaded from cars outside of the plant with an overhead crane and is taken to the foundry floor with an electric locomotive over an industrial track located in the center of the bay and is dumped into the basement through holes in the floor. This is done at night when the molders are not at work.

The hot metal is brought to the foundry floor with an electric hoist on a monorail track that runs

The Batteries of Tumbling Barrels with Piping Connected to the Dust Arresters, Appearing in the Foreground, and the Grinders and Casting Conveyors in the Background at the Left. The sand blast rooms are at the right under the mezzanine floor

directly in front of the cupolas in 1½-ton ladles, and from this it is poured into hand ladles, each molder pouring his own molds. Track ladles are also provided for use when the capacity of the hoists is over-taxed. The cupola that serves the continuous bay is operated all day, starting at 7 a. m. The first heat is taken from one of the adjoining cupolas at 2 p. m., when large molds in the adjoining bay are ready to pour.

HANDLING THE HOT METAL AND CASTINGS

For handling hot metal and castings the plant is equipped with two 2-ton electric trolley hoists, operated on a 500-volt direct current. The hoists have a hoisting speed of 25 ft. per min. and a trolley speed of 450 ft. per min. Each hoist is equipped with an operator's cab, which is closed at the front end to protect the operator from heat and explosions in handling molten iron. Numerous overhead tracks are provided for operating the hoists between the molding floors and the various aisles in the cleaning department. The hoists, together with the switches and turn tables for overhead tracks, were furnished by the Brown Hoisting Machinery Company, Cleveland. In addition to the trolley hoists overhead traveling cranes and an electric locomotive for hauling trucks are used in the new foundry. An illustration, taken in the center bay, shows the three types of handling equipment, a 30-ton traveling crane being located above the monorail track.

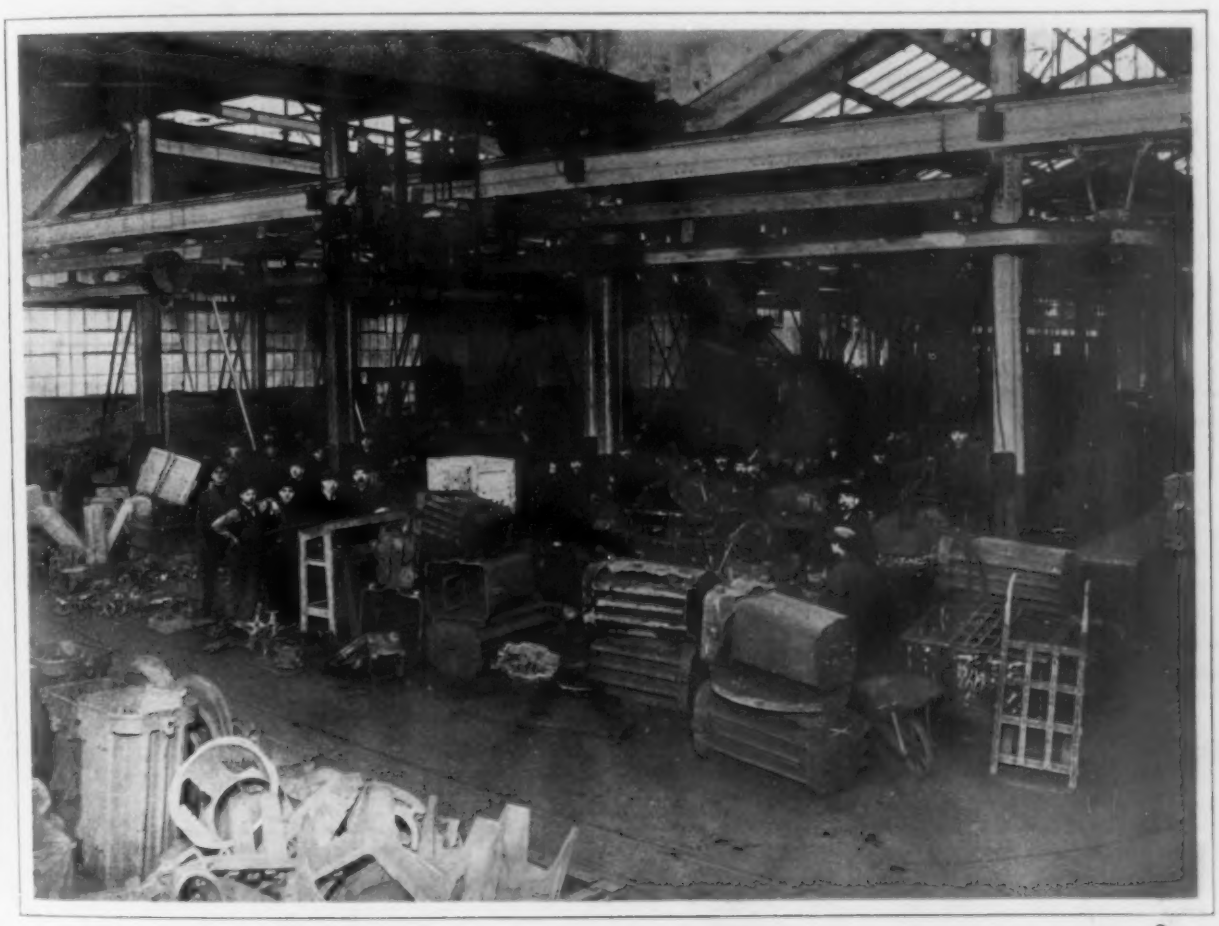
A MECHANICAL CLEANING DEPARTMENT

The cleaning department is located at one end of the new shop. This department is equipped with two batteries of Whiting circular tumbling barrels, 10 in each battery, ranging in sizes from 28 in. to 48 in. diameter, each battery being arranged in two rows with a driving shaft between. One battery is driven by a 50-h. p. motor and the other by a 35-h. p. motor. The motors are located on brackets on the side wall, the drive being through overhead shafting and belting. Another illustration shows the batteries of tumbling barrels and some of the overhead trolley tracks. For cleaning small flat castings a Sly revolving sand blast table 8 ft. in diameter is provided. In addition there are two Sly sand blast rooms 9 x 12 ft. and 7 ft. high.

Back of the tumbling barrels are three parallel units for grinding, chipping and conveying the finished castings to the shipping platform. After cleaning the castings are carried in wheelbarrows to long tables back of the rows of grinders. The monorail system will be used shortly for this work and the castings will be placed on the tables in steel

tote boxes, 80 of which will be supplied for that and other handling purposes. This talpher system will also be used for conveying castings from the continuous floor and other light foundry bays to tumbling barrels.

After grinding the grinder throws the castings on a table in front of him on the opposite side of the grinding wheel. From these tables they are taken by the chippers, whose benches are directly back of the grinding wheels and adjoining the tables. The finisher chips or files it in a vise on his bench and throws the finished casting on to a band conveyor in front of him, a chipper's bench being located on each side of the conveyor, to which the chipper's benches are attached. The conveyors are 40 ft. in length and 24 in. wide and are covered with a cast iron housing with an opening in front of each chipper, through which he throws the finished casting onto the conveyor. The conveyor runs in a horizontal position to near the delivery end, where it rises about two feet, elevating the castings and dumping them on the receiving table at the side of the packing and shipping department. Here they are packed in boxes or barrels and loaded on cars with hand trucks or a traveling crane or loaded in the cars in bulk. The loading track is a depressed transfer track at this end of the plant at the side of the shipping department.



The Grinding and Chipping Department and Conveyors to Carry the Castings from the Chipping Benches to the Packing and Shipping Floor in the Foreground. Crated castings are loaded on cars on a depressed track a few feet at the left, which does not appear in this illustration

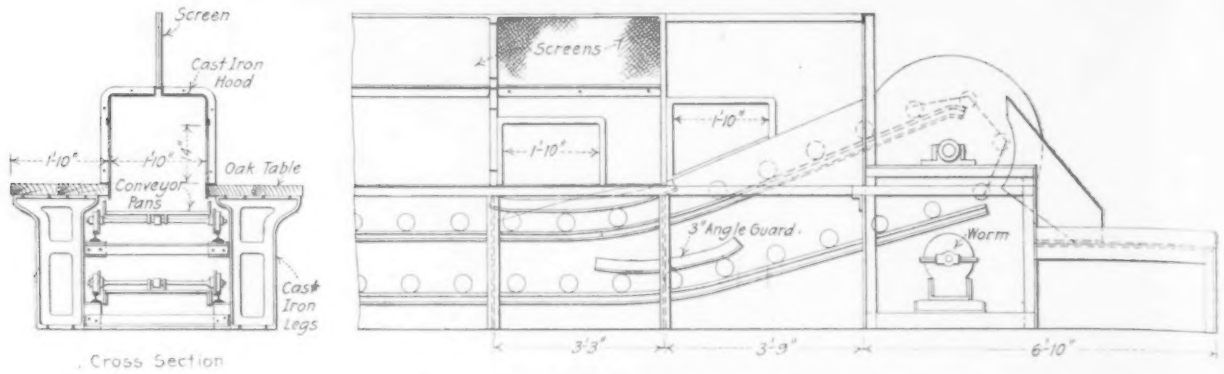
The finishing and shipping department with the grinding wheels, casting conveyors, receiving tables and overhead crane for handling boxes of finished castings are shown by one of the illustrations. The depressed railroad track for loading, just at the left, paralleling the overhead crane does not appear in the photograph.

The grinding is done on 20 emery wheels 16 in. in diameter, with a 2-in. face, furnished by the Springfield Safety Emery Wheel Company. They are arranged in five rows, with four frames or eight wheels in a row, and each row of grinders is driven by a 10-h. p. motor. A speed change is provided by cones on the driving shafts, the speeds being approximately 1130 and 1375 r.p.m. Each casting conveyor is driven by a 3-h. p. motor and has a speed of 25 ft. per min, with a full line load of 40 lb. per lineal foot of conveyor.

THE CORES MADE BY GIRLS

The core room for small cores is located on the mezzanine floor at the front end of the new molding bays directly over the core oven and core storage department. All the core work in this department is done by girls. The girls' core department is entirely separate from the remainder of the plant and has a private front entrance from the street and stairs to the core room. The most interesting features of this core room are the method of delivering cores to the floor below and the method of handling sand from the basement.

In the center of the core room is an endless chain elevator in which the green sand cores are carried from the room to the oven on the floor below. This conveyor is provided with shallow pans, 28 in. wide and 13 in. deep, on which the trays of cores are placed. The elevator is operated at a speed of 12 ft. per minute to 2½-hp. motor. The sand is delivered to the core room from the basement, where it is prepared by an elevator which discharges it into a movable spout that serves three bins used for different kinds of sand, located at one side of the room. By a system of signalling, the core room foreman tells the sand mixer in the basement the kind of core sand he is to send up on the elevator and the foreman turns the chute so the sand will be



Details of Construction of the Castings Cleaning Benches with Mechanical Conveyors

discharged into the proper bin. The sand bins are handy to the benches, and each girl goes to the bins for her supply of sand. When a core maker finishes a tray of cores, she places it on a table near the elevator and another girl attends to the loading of the elevator. The core makers are provided with draw benches, equipped with stripping plates operated with a foot pedal for drawing some types of cores from their boxes.

As indicating the large number of cores produced the core department makes about 25,000 watt-meter cores per month. Most of them are made in metal core boxes which are carefully machined to insure accuracy. In addition to the hand core work the core room is equipped with a Hulett-Demmler air blast core machine with which sand is forced into the core boxes at a pressure of 120 lb. This machine was furnished by the William Demmler Bros., Kewanee, Ill.

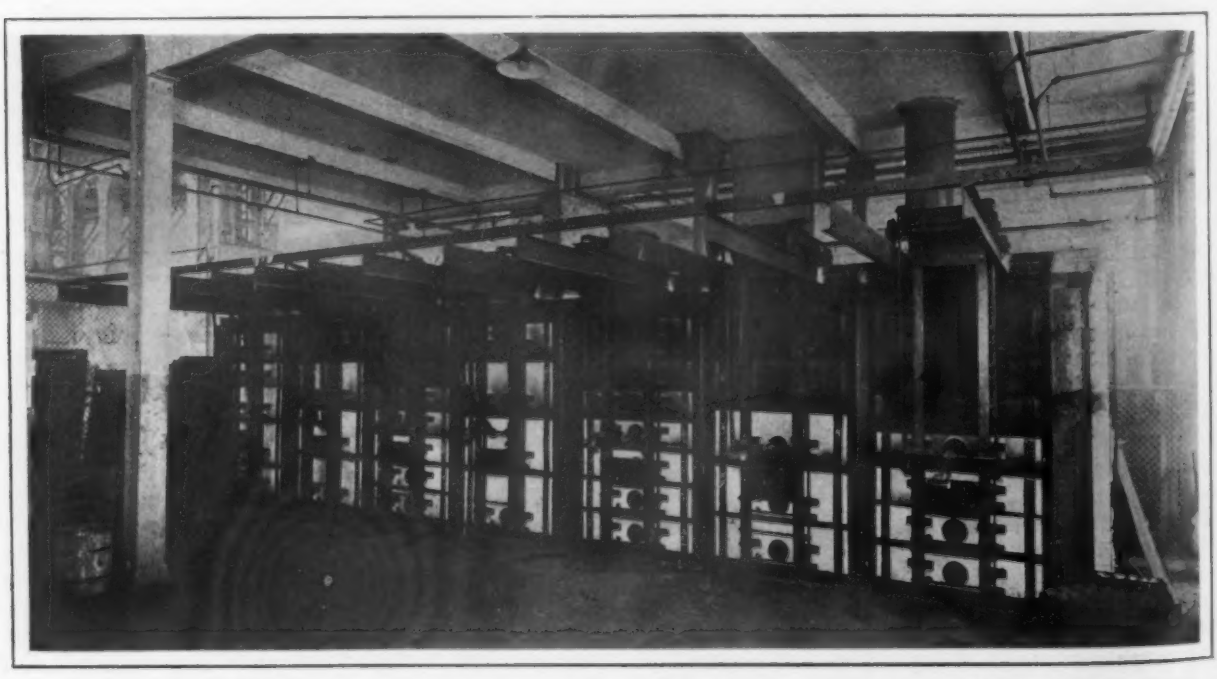
The cores are baked in a seven-section, drawer-type oven furnished by the Coleman Foundry Equipment Company, Cleveland, Ohio, and located in easy reach of the core conveyor. A new feature of this oven is that a double suspension is provided for the trolley, the outer ends of the drawers being supported by a four-wheel trolley running on channels. This prevents tipping of the drawers when they are pulled out. This construction is shown in the illustration of the oven.

Another feature is that some of the oven sections may be fired with either gas or coke. At present coke is used exclusively, the oven being fired from the basement. The oven sections are 52 in. long and 40 in. wide. Some of them have seven drawers and some have a fewer number, various depths of drawers being provided to suit the work.

NEW DEPARTURE IN CUPOLA CONSTRUCTION

In rebuilding the foundry three new cupolas were added, replacing five old cupolas that were worn out. These are located in the new section. They are 72-in. cupolas, two of which are lined down to 54 in. and one to 60 in., the latter with a lining only 6 in. in thickness, a departure from the usual practice in cupola construction. In the old part of the foundry used for heavy and medium work there are two cupolas, one 78 in. and the other 72 in., both lined down to 60 in.

The new cupolas, which were designed and built by the Whiting Foundry Equipment Company, are a new design and all steel, especially adapted to the severe service requirements of continuous melting and claimed to combine the latest and best features for convenience, safety and efficiency in cupola operation. The wind belt is placed above the tuyeres and individual blast boxes are used for each tuyere similar to Bessemer cupolas. Each blast box is fitted with regulating dampers and large peephole covers opposite the tuyeres, as well as with a frame with fusible insert attached to the bottom of the box as a safety device in case of an overflow. This is claimed to eliminate the greatest limitation for hard service in the ordinary construction with tuyeres located within windbox and to provide an



The Drawer Type of Oven Used for Baking Small Cores and Showing the Double Suspension Type of Drawers

absolute safeguard against serious accidents from an overflow.

The construction is said to greatly simplify the operation and to afford the operator a greater range of control than has heretofore been possible. Unequal burning of bed or unbalanced condition, due to the tuyeres becoming clogged, can be readily rectified by adjustment of dampers. The large peephole covers opposite the tuyeres make it possible to reach the entire interior with poke bar if necessary. The tuyere is of the continuous type of liberal area, the cover having inwardly extending flange, which forms a bosh and prevents metal and coke from entering the tuyere. The charging door is placed high above the bed to insure maximum absorption of heat generated. The base of the cupola is of heavy H-beam, angle and plate construction designed for maximum strength against buckling from vertical loads or internal pressures.

The Dust House in the Rear of the Foundry in Which Are Located Three Dust Arrester Units. Adjoining This Is the Pig-Iron Storage Yard

The air blast for the three new cupolas is supplied by two Root positive pressure blowers each direct connected to a 40-hp. motor. These blowers have a capacity of about 7500 cu. ft. of air per min., but in operation only about 4000 cu. ft. of air is used.

Pig iron, coke and scrap are handled in the storage yard, back of the cupolas with a 30-ton electric travelling crane and the electric locomotive which hauls the loaded trucks to a Haughton Elevator Company's electric elevator on which the material is taken to the charging floor.

The dust house of steel plate construction, located at the back of the foundry adjoining the pig iron unloading and storage yard, is shown by an illustration. The dust arrester equipment installed in this house consists of three dust arrester units, furnished by the W. W. Sly Company. These are direct connected with three Garden City cycloidal exhaust fans each direct connected with a 35-hp. motor, driven at a speed of 850 r.p.m. The sand is exhausted in chutes beneath the house, falling into sacks which are removed on trucks on a track beneath. The dust arresters are connected to the tumbling barrels, sand-blast rooms, sand-blast tables and grinding wheels. In practice the air in the sand-blast rooms is changed about ten times per minute.

A MODEL PATTERN STORAGE AND SHOP

The pattern storage and pattern shop building is a seven-story and basement reinforced concrete and brick fireproof building, 70 ft. wide and 200 ft. deep with a high ceiling and of very substantial construction and attractive in appearance. This has a front entrance on the street and is connected with the foundry on one side. The floors are of concrete except the pattern shop which has a maple floor laid over the concrete. There are practically continuous windows in the side, the steel sash being fitted with wired prism glass. The entire building is equipped with General Fire Extinguisher Company's sprinkler system.

The first floor is used for the storage of pattern plates and large patterns, the small patterns being stored on the upper floors. The pattern shop is located on the top floor, which has one sawtooth roof section with a glass surface that faces the north, making this floor unusually well lighted. The building is served by two electric elevators, one a freight elevator, 11 x 15 ft., and the other a passenger elevator, 7 x 9 ft., the latter also being used for handling smaller patterns if the larger elevator is busy. An industrial track runs into the building from the foundry and down the center aisle of the first floor for handling large patterns on trucks. The pattern

The Pattern Shop Which Occupies the Top Floor of the Pattern Storage Building

shop is completely equipped for making both wood and metal patterns, the metal pattern shop being located at one end of the floor. One of the illustrations is a view taken in the wood-working pattern shop and gives a clear idea of the type of construction of the building. All wood-working machinery has individual motor drives except the lathes which are grouped and are motor driven from one shaft.

Nearly half of the first floor, which is 18 ft. in height to the ceiling, is used for the storage of pattern plates for molding machines. These plates are stored on shelves in racks of various widths corresponding with the width of the plates. The shelves, which are 2¾-in. deep, are formed by strips, attached to the wooden uprights of the racks. The plates slip in on these strips, making a solid wood shelf unnecessary. The rack sections are located transversely across one side of the room and are 44 in. wide, the pattern plates being placed in each side. A 44-in. aisle separates the sections. The racks extend to the ceiling, arranged in two tiers with a balcony between so that space is saved and all shelves are easily accessible. On each shelf is attached a metal number and all racks and sections are designated by numbers and letters. The large number of pattern plates used is indicated by the fact that shelves are provided for 8000 pattern plates. A similar plan is followed in the storage of patterns on the upper floors.

A simple card index system is employed in keeping a record of the patterns and their locations. Cards are kept in a filing cabinet on the first floor, these bearing the pattern number and other detailed information. A reference to the proper card in the index shows on what floor, section, rack and shelf the desired pattern is located. Adjoining the record room is a fireproof vault in which the cabinets of cards are placed at night.

Adequate toilet room and locker facilities are located in various parts of the plant, both hot and cold water being provided for the lavatories. The girl core makers have a rest room and lunch room equipped with hot plates for preparing lunches.

Prack & Perrine, Pittsburgh, Pa., were engineers and contractors for the foundry and also architects for the pattern shop and pattern storage building. The moving parts of the sand conveyors and the finished casting conveyors were designed and built by the C. O. Bartlett & Snow Company, Cleveland, Ohio.

Scranton Iron & Steel Company's New Plant

The Scranton Iron & Steel Company, steel fabricator, Scranton, Pa., has plans nearly completed by its engineering department for a three-story building which will house its stock, shops and offices. The structure will be erected at 1335 and 1337 Capouse Avenue, where the company is now located. The first floor will be used for the storage of structural materials and their fabrication. On the second floor will be the offices of the company and a shop for the manufacture of ornamental iron work, iron stairs, fences, grilles, etc. The third floor will be occupied by the designing and drafting department. Electric cranes will handle all material within the building, and a spur of the Delaware & Hudson Railroad will run through the ground floor. The company has erected three large buildings in Scranton in the past year. E. L. Keuling is president and general manager; J. H. Mears, secretary and treasurer; J. H. D. Cloran, vice-president and superintendent of construction; C. F. Wood, chief engineer, and Herman Baberadt, purchasing agent.

A New Chain Factory

The Howe Chain Company, Muskegon, Mich., will begin business with an authorized capital of $100,000, specializing in the manufacture of chains of highest quality for elevating, conveying and power transmission purposes. The incorporators are Glenn G. Howe, late vice-president of the Link-Belt Company; Ralph J. Teeter, secretary of the Standard Malleable Iron Company, and late chief engineer of the Indianapolis works of the Link-Belt Company, and Joseph E. Christian, late superintendent of the Indianapolis works of the Link-Belt Company. The new company has secured a plant in Muskegon, which it is remodeling and which will be placed in operation as soon as the difficulty of obtaining raw material and necessary equipment can be overcome. The company will embark in business with the advantage derived from the extensive experience of its incorporators.

The By-Products Coke Corporation, Semet-Solvay Company and Calumet, Hammond & Southeastern Railroad Company announce the removal of their offices to the McCormick Building, 332 South Michigan Avenue, Chicago.

Heavy Punching and Shearing Machine

The demand for a heavy universal machine with a wide range and ample capacity for a variety of work, including multiple punching, shearing and pressing, was recently met by the Cleveland Punch & Shear Works Company, Cleveland, Ohio. The machine is of extremely heavy construction and is designed to exert pressures up to 750 tons.

By referring to the illustration it will be seen that the machine is a combination multiple punching, shearing and forming press, of the gap pattern. The housings are each of one piece and are solid with a 15-in. gap. The plunger is solid and is provided with generous ways and taper end gibs to insure good wearing properties. The bottom face is 30 in. wide, with T-slots extending from front to back to which the double steel bolster blocks that carry the double row of punching attachments are fastened. When in the topmost position the bottom face projects below the gap of the housings to permit the free removal of bolster blocks and attachments. The lower girder is of substantial solid design, tongued and bolted to the housings by twenty 2-in. through bolts having castellated nuts. The upper face of this girder is also T-slotted and carries double bolster blocks on which the double row of die blocks rest.

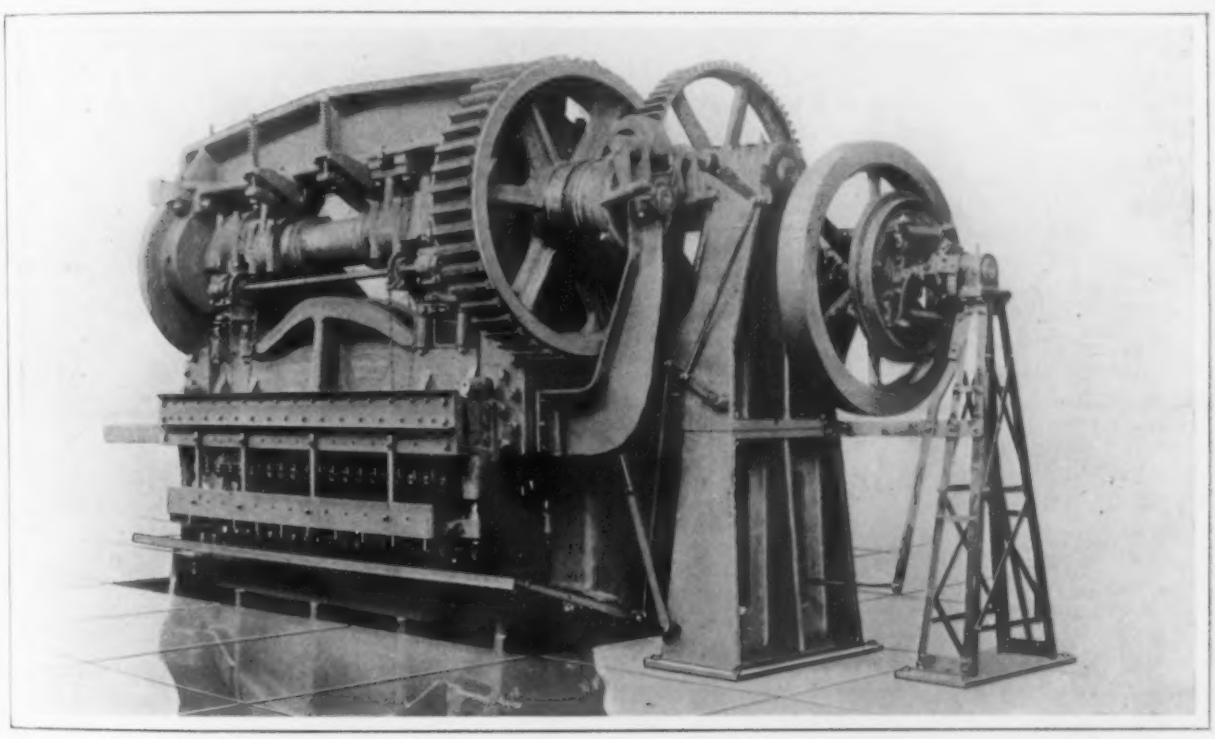
Of particular interest is the means of adjusting the plunger. The adjustment of 3 in. is accomplished by the use of chains through worms and forged steel sleeve nuts. The screw and sleeve nuts are high carbon steel forgings. The entire mechanism is entirely inclosed and runs in oil. The plunger is counterbalanced by weights, operating underground which, it is pointed out, removes all possibility and appearance of danger from overhead moving parts. The machine is equipped with a positive automatic non-clicking jaw clutch as well as a friction clutch, which permits of a delicate adjustment of the plunger and intermediate stoppage at will of operator.

The all-steel gearing and driving mechanism, including a 75-hp. direct-connected motor, are located between one main housing and the outer auxiliary housing, so as to provide clear working space in the rear and between the housings.

The tool equipment illustrated consists of forty hand gagged punching attachments, arranged in two parallel rows, mounted upon bolster blocks which are adjustable from front to rear. Each attachment is individually adjusted and held in place by quick change bolts, which permit the ready detachment of any tools anywhere from the cluster. A stripper is provided to cover the entire die space of the machine.

The principal dimensions of the machine are as follows:

Distance between housings, in.	136
Stroke of plunger, in.	8
Adjustment of plunger, in.	3
Distance between lower girder and plunger with the plunger up, in.	32
Face width of main gear, in.	16½
Pitch of main gear, in.	4½
Gear ratio	20 to 1
Over-all height, in.	182½
Over-all length, ft.	22⅝
Height from bottom of housing to top of dies, in.	63



A Universal Machine for Punching, Shearing and Pressing Capable of Exerting a Maximum Pressure of 750 Tons and Having a Chain and Worm Adjustment for the Plunger

The first machine of this type was installed in the plant of the Chicago-Cleveland Car Roofing Company, Warren, Ohio, and on account of its weight, 210,000 lb., and the size, it had to be shipped knocked down.

Pamphlet on Welded Pipe Connections

The autogenous welding of National pipe is made the subject of a pamphlet of 50 pages issued by the National Tube Company, Pittsburgh, Pa., as its bulletin No. 26. The booklet contains generous extracts from a number of important papers on this subject as well as some independent contributions on various features of pipe joints welded by different processes. The bulletin is noteworthy for the large number of striking and informing illustrations and owing to the recent development in the art, the publication is timely.

Six pairs of safety congress-type shoes are to be given as prizes for accident-prevention suggestions offered by employees of the Inland Steel Company, Indiana Harbor, Ind.

Mining of Manganese Ore in Virginia

Reopening of the Crimora Mine Formerly Operated by the Carnegie Steel Company—Provisions for Washing and Crushing Clay-Bearing Ores

AMERICAN manganese ore in large quantities will soon be available for the steel industry, it is expected, from the Crimora Manganese Corporation's property at Crimora, Va. The company has perfected extensive mining plans and purchased equipment which it believes will adequately meet part of the needs of the peculiar mining conditions at these deposits. Special heavy machinery, electrically driven, is being installed by the Ruggles-Coles Engineering Company, New York, and 150 men are working day and night shifts to complete the plant for operation in April.

The Crimora mine is located in Augusta County, Va., at the foot of the Blue Ridge and on the Norfolk & Western Railroad, from which a branch line of three miles runs to the mine. According to Governments reports the mine has produced over 50 per cent of all the manganese ore ever mined in this country. Recent extensive drillings and exploration show over 5,000,000 tons yet remaining in the deposit, according to engineers' estimates.

For many years the mine has had a production of about 200 tons monthly, but the old milling equipment has recently been dismantled to make way for the new. Excavating and transportation equipment, increased reservoir water storage, pipe lines, etc., are being hurried to completion. The first unit of this plant, shown in one of the illustrations, is 66 x 130 ft., and has a capacity of 5000 tons of washed manganese ore monthly. Water is brought by a flume and a 20-in. pipe line, also shown in an illustration, from a storage reservoir nearly two miles away in the mountains, under a 250-ft. head. The old reservoir dam has been built higher, increasing the storage to meet the requirements of the new mill and as additional mill units are built the company will develop as required its reserved reservoir sites which have a total storage capacity of 450,000,000 gal.

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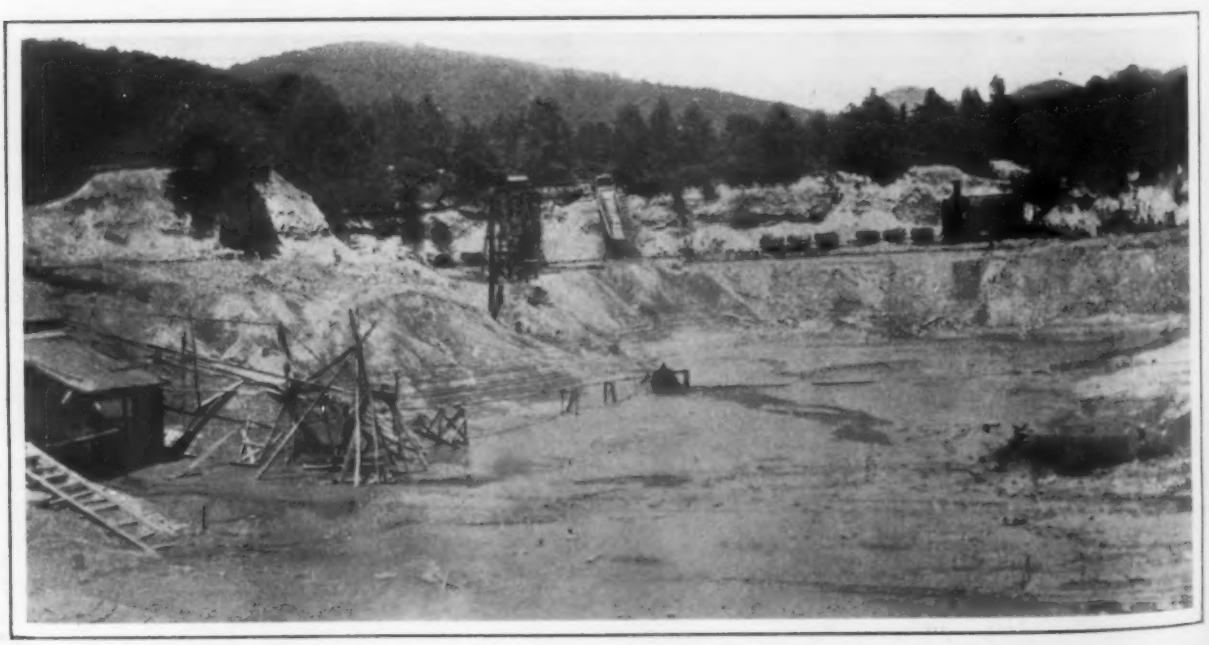

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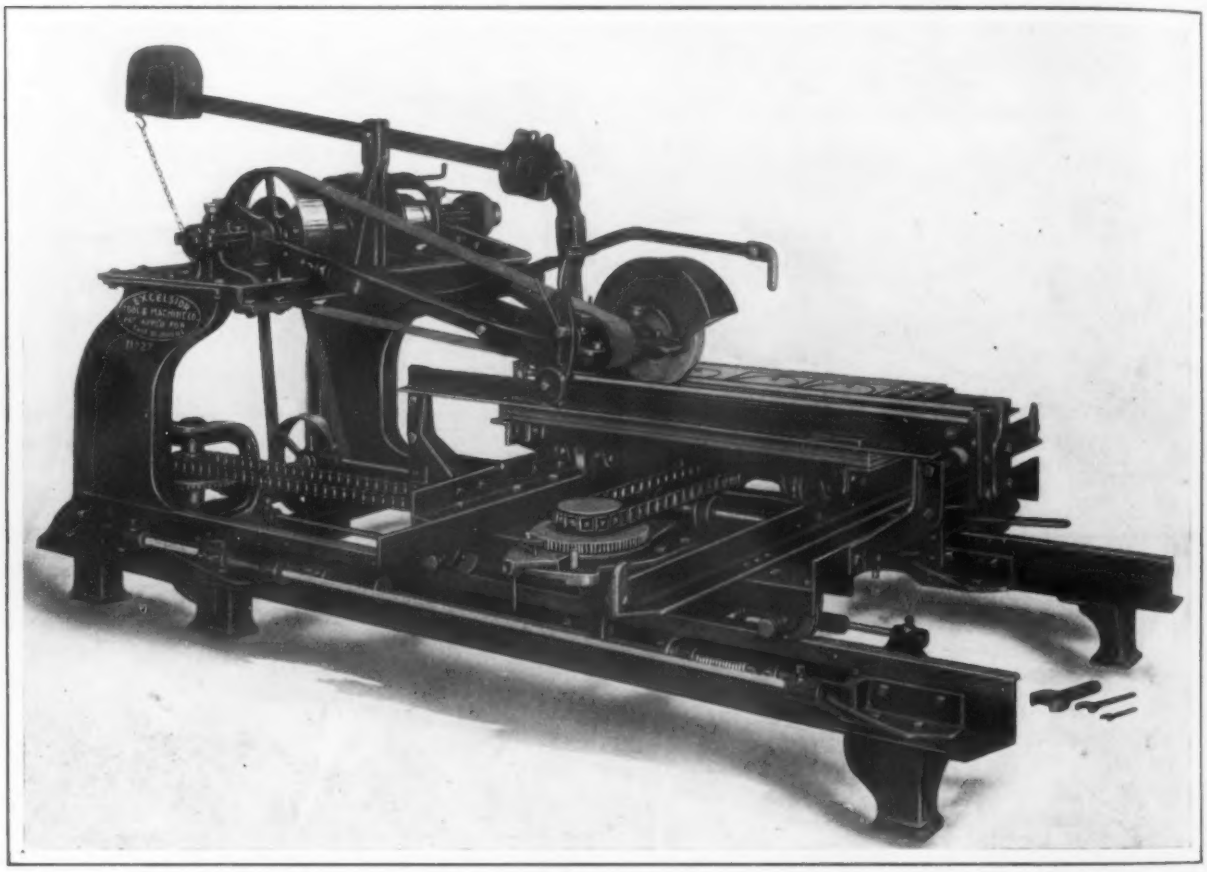

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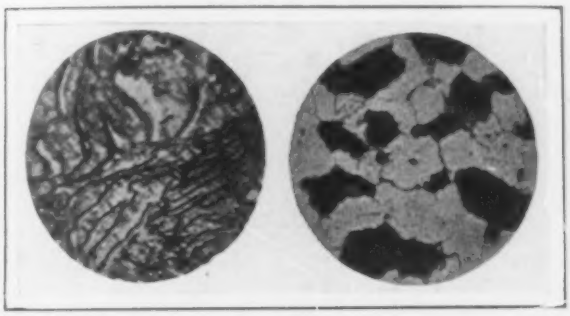
Exceptional results in taking photomicrographs by means of Mazda electric lamps have been obtained. W. E. Brewster of the engineering department of the National Lamp Works of the General Electric Company, in an article on "The Mazda Lamp in Photography" in the *General Electric Review* for February, says that the optical system used in photographing objects through a microscope is very similar to that of a condensing-lens enlarger. The distinction lies in the greater number, the finer adjustment and the higher power of the lenses employed in photomicrography. The constancy and high intrinsic brilliancy of the light from Mazda C lamps make these lamps particularly suitable for this class of work. In general concentrated-filament lamps should be used, the 250-watt size being best adapted to most instruments.



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Before the day of the Mazda C lamp, high-power photomicrographic instruments were usually equipped with carbon arc lamps. Mazda C lamps may be very readily adapted to such instruments by removing the ground glass and mounting the lamps so that the midpoint of one coil of a filament coincides with the working position of the arc. In adjusting the lenses, the filament should be focused on the diaphragm of the sub-stage condenser and then moved along the optic axis just enough to diffuse the image of the lamp in the field of the microscope.

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Mining of Manganese Ore in Virginia

Reopening of the Crimora Mine Formerly Operated by the Carnegie Steel Company—Provisions for Washing and Crushing Clay-Bearing Ores

AMERICAN manganese ore in large quantities will soon be available for the steel industry, it is expected, from the Crimora Manganese Corporation's property at Crimora, Va. The company has perfected extensive mining plans and purchased equipment which it believes will adequately meet part of the needs of the peculiar mining conditions at these deposits. Special heavy machinery, electrically driven, is being installed by the Ruggles-Coles Engineering Company, New York, and 150 men are working day and night shifts to complete the plant for operation in April.

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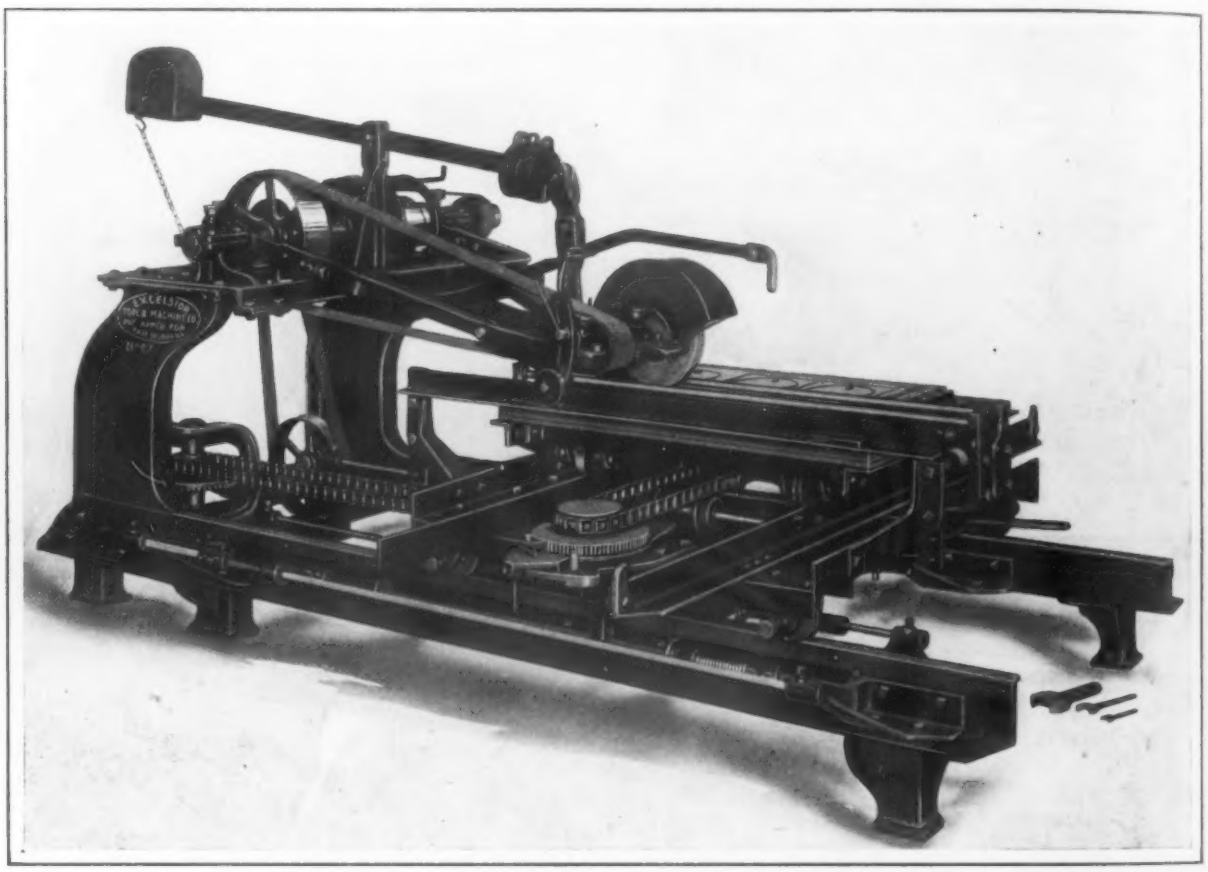

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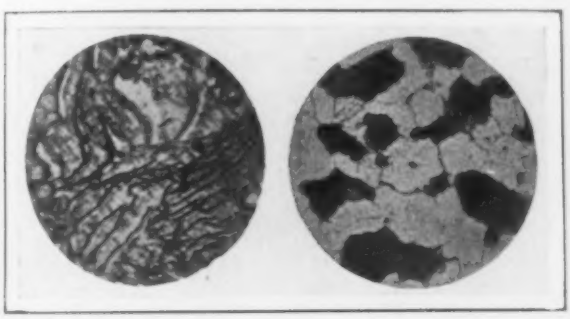

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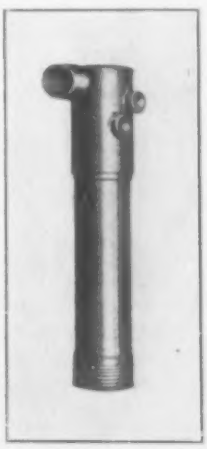

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uniform product. In a sheet annealing furnace, for example, the temperature in one part was 900 deg. Fahr. and twice as much in another, while twelve pyrometer readings taken at as many different points gave varying results.

The mechanism of the I-Rite pyrometer consists of an illuminated transparent colored band which gives the exact colors of the heated metal and serves to register the corresponding temperature. An unskilled workman, it is found, may obtain as good results as a trained metallurgist even though the former may be color blind to some extent. This is true, it is explained, because a person who is color blind can read with the same facility as one who is able to distinguish color, and while the color may appear as green or blue instead of red or orange, the intensity is duplicated.

Although the instrument is made in two ranges, 1000 to 1800 deg. Fahr. and 1800 to 2300 deg. Fahr., it can also be used for taking the temperatures of heated bodies either within or without a furnace. In this way it is possible to obtain temperatures of heated steel as ingots, billets, rails, armor plate, structural shapes, forgings, castings, etc.

SPEED OF TESTING MACHINES

A Steady Decrease in Elastic Ratio as the Rate Is Reduced

BY G. B. WATERHOUSE

In the breaking of tensile test pieces the speed of the machine has a certain influence on the results obtained. This has been known for many years and attention has been called to it by many authorities. For instance, H. H. Campbell gives results in his book obtained on rivet rods tested at five different pulling speeds, the highest being 4.50 in. per minute, and the lowest 0.07 in. per minute. He comes to the conclusion that the higher the speed, the higher the elastic limit, ultimate stress and percentage of elongation, although the latter is not supported by his evidence.

The American Society for Testing Materials considered the matter important enough to appoint a committee to investigate it. This committee, since disbanded, known as Committee O, had for its chairman Paul Kreuzpointner, and for secretary H. V. Wille. Its reports may be found in volumes 5, 6 and 7 of the *Proceedings*, and contain valuable discussions on the subject, together with the results obtained on various grades of wrought iron and steel. The work was carried out to discover a safe maximum speed of testing and the recommendations for steel were "a maximum speed of 3 in. per minute for steel of the forging grade, where a section 2 in. between punch marks is used, and a speed of 6 in. for steel of the boiler grade where a section 8 in. between punch marks is used." In regard to wrought iron: "Your committee feels warranted in recommending that in the commercial testing of stay-bolt and common wrought iron any speed up to and including 6 in. per minute gives sufficiently safe and reliable results for commercial purposes." A final quotation may be given from the 1915 Year Book of the society, page 471, where in speaking of standard methods of testing we find: "All information obtained confirms the investigations of Committee O to the effect that within the limits of speed common in commercial testing the effect of different speeds on results is not of observable moment; that is, within ranges of speed varying from 1 in. to 6 in. per minute."

The top-poured ingots were 19 x 23 in. at the butt and after the usual time in the soaking pits were rolled into billets 4 x 4 in. Several billets were taken from the lower part of the ingot and after reheating were rolled into rounds, some into 39/64 in. (0.609 in.) diameter, and other into 23/32 in. (0.719 in.). Enough of this finished material was then taken to carry out the tests, the results given below being the average of four tests at each speed on the steel as rolled and without being machined.

The results given below were obtained on steel of about 60,000 lb. per sq. in. tensile strength, and are published in the hope that they may be of interest to students of the subject. The steel was Bessemer for bolt rounds, the analysis of the ladle test being:

	Per Cent
Carbon	0.08
Manganese	0.47
Sulphur	0.128
Phosphorus	0.092
Silicon	0.01

Two machines were used, one a Riehle of 200,000 lb. capacity with six speeds, and the other an Olsen of 300,000 lb. capacity with three speeds. The speeds in inches per minute are shown in the tables. The elastic limit was obtained by the drop of the beam, which was sharp and clearly defined in each case. The results obtained on the Riehle according the usual method of testing were as follows:

Diameter of Bar, In.	Elastic Limit, Lb. Sq. In.	Ultimate Stress, Lb. Sq. In.	Elongation, 8-In., Per Cent	Reduction of Area, Per Cent
0.609	45,410	62,630	28.1	60.0
0.719	44,215	64,050	28.2	51.8

The usual method consists in running at speed No. 4, 1.20 inches per minute, until the elastic limit is reached, then changing to speed No. 1, 7.50 inches per minute, to break the piece.

Table 1—Results on Bars 39/64-In. (0.609-In.) Diameter

Machine	Speed	Inches per Min.	Elastic Limit, Lb. per Sq. In.	Ultimate Stress, Lb. per Sq. In.	Elastic Ratio	Elongation, 8 In., Per Cent	Reduction of Area, Per Cent
Riehle	1	7.50	48,220	63,280	76.2	27.6	57.9
Riehle	2	3.75	47,900	62,570	76.5	27.7	58.2
Riehle	3	1.15	45,000	61,630	73.0	27.0	56.5
Riehle	4	1.20	44,990	61,560	73.0	26.1	52.4
Riehle	5	0.54	43,800	61,360	71.3	27.0	54.2
Riehle	6	0.16	43,390	60,780	71.3	28.7	55.7
Olsen	1	3.00	46,700	61,560	75.8	28.8	57.1
Olsen	2	1.33	45,000	61,300	73.4	28.3	55.8
Olsen	3	0.50	44,310	61,826	71.6	28.3	59.8

Table 2—Results on Bars 23/32-In. (0.719-In.) Diameter

Machine	Speed	Inches, per Min.	Elastic Limit, Lb. per Sq. In.	Ultimate Stress, Lb. per Sq. In.	Ratio	Elongation, 8 In., Per Cent	Reduction of Area, Per Cent
Riehle	1	7.50	48,385	63,897	75.7	28.4	52.4
Riehle	2	3.75	46,675	63,750	73.2	26.8	51.0
Riehle	3	1.15	45,695	63,427	72.4	27.8	50.3
Riehle	4	1.20	45,077	62,755	71.8	27.9	51.0
Riehle	5	0.54	44,955	63,317	71.0	28.9	51.8
Riehle	6	0.16	44,590	63,500	70.2	28.4	51.3
Olsen	1	3.00	46,495	63,405	73.3	27.9	50.0
Olsen	2	1.33	45,752	63,130	72.4	28.3	50.8
Olsen	3	0.50	44,642	62,880	71.0	26.7	49.8

The most striking result is the steady decrease of the ratio of the elastic limit to the ultimate stress as the speed of pulling is reduced. The ultimate stress also decreases, this effect being more marked in the case of the 0.609 in. diameter rounds than in the larger ones. The elastic limit decreases more in proportion than the ultimate stress, as shown by the ratio. No less interesting is the small effect produced on the elongation and reduction of area, which in regard to the elongation particularly is practically negligible.

An American syndicate recently opened a mine of manganese ore at Madinga, in the province of Colon, Panama, according to Consul J. D. Dreher of Colon, and has made a trial shipment of 900 tons to the United States. One of the owners states that 1500 tons a month can probably be shipped if vessels are available.

A lubricant for use in cutting threads in aluminum has been put on the market by the Tolgate Engineering Company, 9 Glengall Terrace, Old Kent Road, London, S. E., England. According to *Engineering* of London, it has given a good account of itself in the manufacture of aluminum adaptors for shells.

Melting Steel and Gray Iron in a Cupola

Further Data on the Manufacture of Semi-Steel and Its Present Commercial Position —What the Temperature Records Show

BY DAVID McLAIN

In the March 2 issue of THE IRON AGE was published an exceedingly interesting and valuable article on the manufacture of semi-steel, and the comments by Dr. Richard Moldenke were illuminating, to say the least, even if we are unable to agree with many of his statements and conclusions.

Dr. Moldenke's chief contention is against the designation of this metal as "semi-steel." He insists upon classing it with the gray iron mixtures, notwithstanding the fact that it has properties, when properly made, never approached by any gray iron. If this metal is not semi-steel, what is it? Does Dr. Moldenke object to the use of this term which, in a measure, relates this product to steel? Or does he object to its use because he believes it removes from the gray iron family what he considers its most desirable and valuable mixture? It is generally agreed among metallurgists that iron and steel nomenclature, in spite of the great work done by the International Society for Testing Materials, is still in an extremely chaotic state and the line of demarkation between many metals, despite learned definitions, is extremely obscure.

Trade usage has been a greater factor in the establishment of the terms constituting iron and steel nomenclature than all of the arbitrary rulings of congresses and meetings of metallurgists that ever have been held, and Dr. Moldenke must concede that it is hardly within the province of one man to designate a metal other than what it is after it has been defined by the trade, the world over, for more than half a century.

EARLY PRODUCTION IN THE CUPOLA

If Dr. Moldenke's conclusions are to be measured by his historical citations, we regret to be compelled to believe they are sadly distorted. Dr. Moldenke credits the first semi-steel experiments to J. S. Seaman, of the Seaman, Sleeth Company, Pittsburgh. We do not wish to detract from the wonderful accomplishments of this dean of America's foundry industry and we would be the first to pay him homage for this great achievement if the statement were borne out by the facts. Unfortunately, however, his experiments were conducted in an air furnace, whereas the present discussion relates to the manufacture of semi-steel in a cupola, the way in which 99 per cent of the semi-steel castings to-day are produced.

According to an English authority a patent was issued on the manufacture of a new cast or wrought metal containing steel, more than half a century ago, and this discovery then was acclaimed by British foundrymen generally as semi-steel. To the late Major McDowell of Chicago must be attributed the honor of placing the semi-steel process on a scientific basis and upon his great work as a foundation the accomplishments of to-day have been made possible.

It is unfortunate, of course, that any cast metal containing from 5 to 50 per cent steel is designated as semi-steel and herein we are in hearty agreement with Dr. Moldenke that "a matter of commercial ethics is involved." Our contention always has been that no metal could be defined as semi-steel unless it contained from 30 to 50 per cent steel and the value of this metal, to some extent, has been detracted from by those who will offer a product as semi-steel which is not even a good grade of gray iron. However, the semi-steel industry is not alone in suffering from this violation of trade ethics. To-day, some manufacturers term their steel castings electrical, even if poured from an open-hearth furnace, a converter or a crucible, and for many years some foundrymen have claimed to manufacture and have sold as "malleable steel" a product which in some instances was graded as the poorest malleable iron.

AUTOMOBILE AND MOTOR TRUCK CYLINDERS

The old saw about imitation being the sincerest flattery applies likewise to semi-steel, and the "commercial ethics" to which Dr. Moldenke referred are daily being violated in the imitation of this product by those who do not know how to melt and mix such metal. The best proof of its value and its existence as a distinct product is the fact that the bulk of the automobile and motor truck cylinders used in this country to-day are made from semi-steel, and it is the only metal that has been able to drive from the American market the wonderful cylinder castings shipped into this country in the past from France at fabulous prices. But the use of semi-steel not only is limited to comparatively light work. Many foundries have established a reputation for the manufacture, under high-sounding trade names, of vacuum cylinders and ammonia steel castings which, upon investigation, are found to be semi-steel. The foregoing are only a few instances of the remarkable accomplishments of semi-steel. They could be multiplied indefinitely.

That Dr. Moldenke has recognized the value of this metal for a period of many years is indicated by a letter received by the writer from him on Feb. 2, 1904, from which we quote as follows:

> You have hit on a point which bears out my years of contention on the oxidation of iron in the melting process. Where you use such a high percentage of steel, you necessarily have a higher temperature in the melt; and with this higher temperature any addition of manganese means a reaction with the oxygen present from the unavoidable burning of the steel in the charges.
>
> In ordinary cast iron this cannot take place, as the temperature is not high enough, hence manganese is not a good thing there. I presume that you must lose quite a lot of manganese by this process, which shows that it is effective and does the work it is put in for. I can only congratulate you on this work and hope that you may reap some good returns from it. Nevertheless, it seems a pity to think that others should be made to lose money all the time for the want of knowing this.

In the foregoing letter Dr. Moldenke makes the following statement which must be questioned:

> Usually this is complicated by undue oxidation of the steel before it melts and a none too high temperature of the metal from the spout.

BEHAVIOR OF STEEL IN THE CUPOLA

When properly made, semi-steel exceeds in both temperature and fluidity any other mixtures melted in the cupola. The oxidation of steel when melting scientifically is scarcely perceptible and when steel is heated in the presence of coke it begins to absorb carbon from the coke, faintly at low temperatures, but as the temperature is increased and both metal and coke become incandescent, the steel absorbs large percentages of carbon and no longer is the steel of commerce, but a highly carbonized metal that is ready to melt and will melt before the iron in the same charge. The fact that steel melts first puzzles chemists, metallurgists and others who evidently do not take into consideration that steel has a great affinity for carbon and sulphur and absorbs a large quantity of carbon from the fuel.

Those familiar with laboratory experiments know that if steel is added to gray iron mixtures and melted in a crucible, the total carbon will be reduced. They

also know that when steel alone is melted in a crucible it requires a higher temperature to melt it than the mixture of steel and gray iron. On the other hand, Dr. Moldenke claims that the addition of steel increases the melting temperature of the mixture. When steel is mixed with gray iron and melted in a crucible a slight loss will occur by oxidation and the carbon will increase somewhat, due to the absorption of this element from the pot. The total carbon as calculated in the iron will remain practically the same, but as the steel content of the mixture will add to the total weight of the resultant metal without a corresponding gain in carbon, the total carbon, of course, will be less than if all iron had been used. That condition, however, does not exist when melting steel scientifically in the cupola.

If steel only is melted in a crucible, the chemist is quite right in his contention that steel requires a higher melting temperature than gray iron, but the same conditions are not met with in melting iron or steel in a cupola. When melting steel with cupola mixtures, high carbon coke is used for fuel. Coke, of course, also can be used in crucible melting, but in this practice the metal does not come in contact with the fuel and therefore it does not absorb carbon from it. On the other hand, steel melted in the cupola comes into intimate contact with the fuel and owing to the very low percentages of the different elements in the steel, it has a strong affinity for them, particularly carbon. Consequently, when the steel is heated to redness, it begins to absorb carbon and when the steel and fuel both become incandescent, the steel becomes saturated with carbon. In this state it is not steel as we know it commercially, but it is a high carbon metal, and as the carbon increases the melting point of the steel decreases until the temperature at which it will melt is lower than the temperature of the cupola. Commercially successful semi-steel must be a high total carbon metal, otherwise castings of light section will be too hard.

THE USE OF CHILLS

Probably the most surprising statement contained in Dr. Moldenke's comments on semi-steel is his reference to the use of chills, this paragraph being as follows:

> The lower the total carbon and greater the oxidation of the metal gotton when steel scrap is used, the greater the final contraction of the castings and chances for interior shrinkage—hence the use of chills.

Many years have elapsed since chills were used in molds into which semi-steel is cast. The practice to which Dr. Moldenke refers may be used to some extent in some shops abroad, but none of the modern American foundries making semi-steel ever think of resorting to the use of chills.

Recently we received a communication from a foundryman who had been using chills or denseners quite extensively in the manufacture of his castings; but when he employed a suitable semi-steel mixture he discontinued the use of chills entirely and states that he seldom has porous castings and only recently has melted in his cupola 50 to 60 tons of chills that formerly were employed in his shop every day.

So insistent is the demand to-day for semi-steel that there is a need for a standard specification for this product, and one of the technical societies, such as the American Society for Testing Materials or the American Foundrymen's Association, should appoint a committee to look into the properties of this metal and prepare a specification that will be representative of American practice and which will safeguard the user and at the same time will be fair to the producer.

All the formal details having been arranged, the Mississippi Valley Iron Company, St. Louis, Mo., has begun work on its blast furnace, which it is expected to have ready for operation by June 1. Shipments of ore from Iowa are to begin shortly. Coke from the by-product plant of the Laclede Gas Light Company, St. Louis, will be used. Edward F. Goltra is president; T. S. Maffitt, vice-president; J. D. Dana, secretary-treasurer; P. C. Maffitt, William Bagnell, E. C. Dameron, D. R. Francis, John C. Roberts and Robert H. Stockton, directors.

POURING TEMPERATURE OF IRON

Effect on the Strength of Castings—Importance of the Solubility of the Components

Pouring temperature, with special reference to the strength and properties of iron castings, was discussed by E. L. Rhead of the Municipal School of Technology before the Manchester (England) Association of Engineers in a paper entitled "Pouring Temperatures and Strength of Castings." An abstract follows:

Frequently when dealing in irons low in phosphorus, sulphur and manganese, very small variations in the silicon, in the neighborhood of 1 per cent in large castings, have an enormous influence on the structure, changing it completely from a fine to a coarse grain or vice versa. It would seem possible that the amount necessary to procure precipitation of graphite coincided with certain concentration of the solution as frequently occurs in other cases, and that the reason for the small amount having the same effect in thicker castings is due to the slower cooling affording greater facilities for diffusion and concentration. When the solution becomes rich enough in silicides, separation and precipitation of the graphite proceeds and the grain becomes open. In that case the initial temperature of the mass and the rate of cooling will exert very great influence on the concentration of the silicides by the withdrawal of the iron-rich body and thus on the grain and strength of the metal, and incidentally on the internal stresses and liability to spontaneous fractures while cooling or subsequently. It is probably in this region that many of the vagaries of metal and unexplained causes of fracture must be sought.

In presence of other bodies, such as phosphides, the proportion of silicon necessary to produce carbide saturation and precipitation is less, and hence the completeness of the graphite precipitation and reduction in shrinkage that is secured with such irons.

STRENGTH AT HIGH OR LOW TEMPERATURES

It has been frequently stated that in some cases irons cast at high temperature have a tendency to be closer and stronger than those cast at a lower temperature. The author's experience has been that the grayness of the iron cast at the lower temperature is of quite a different order. The lack of strength may be ascribed to the fact that before pouring, the complete solubility has ceased to exist; the various components of the metal were in no longer perfect solution in each other. The metal may have passed through stages of liquid crystallization which are subsequently broken up and cannot be re-formed or resumed at the lower temperature or some of the products of the final crystallization may have assumed a colloidal state, and, being subsequently mixed up in the pouring, form an emulsion with the remaining fluid, preventing it from following the ordinary process of solidification. It is also certain that in some cases actual separation of solid matter has begun as the case of irons throwing up kish.

All cases of kishy irons must not be attributed to the fall in temperature of the metal. There is every probabilty that in melting in the cupola some of the graphite is not re-dissolved by the iron and the metal, as it runs from the cupola, contains free graphite which rises in the ladle. Such graphite interferes with the development of structure and gives rise to other difficulties, all of which tend to lower the strength of the casting. For example, they form solid attachments for gas which may form blowholes or gas films and probably lead to formation of larger flakes than would otherwise be the case, as, by acting as nuclei, the rest of the graphite may be deposited on it much in the same way as solids are placed in crystallizing liquids to receive the crystals formed. For these reasons probably test bars and castings, run at high temperatures, have greater strength than those run at lower temperatures.

THE CORRECT POURING TEMPERATURE

As to what is the correct temperature at which to pour a casting, obviously it is impossible to state any definite temperature that will apply to all cases as

regard must be paid to so many different factors; not only to the nature of the metal, but, among others, to the size of the casting, the length of time it will take to pour, the fluid contraction and the final shrinkage.

It may be laid down that the most suitable temperature for casting is that which will allow the mold to be completely filled with molten metal, which, when the mold is full, still retains all its constituents in completely fluid solution, and all preparations as regard metals and gates must be made to that end. It is not only unnecessary, but inadvisable to heat the metal beyond that temperature since the longer period of setting prolongs the period during which the casting is weak, gives opportunity for the formation of coarser graphite, and the formation and transference of the most fusible eutectic possible in the iron used, with the formation of shrink holes and local weakening where it has been withdrawn.

With the knowledge of the advantages in strength which result from the rapid cooling of castings, whether by the use of specially designed chilling plates or by accelerating it in other ways, the author suggests that those castings are weakest in which, from any cause, the separation of iron-carbide or graphite precedes the proper development of crystallization in the mass. In the many examples of strong iron that have come under the author's notice, in which similar materials have yielded widely different results, those giving the higher figures have had this crystalline development and those giving the lower figures have been confused, or in some cases almost striated when microscopically examined.

From these considerations it would appear that for every type of metal and for every casting there is an ideal pouring temperature at which the slowness of the cooling shall not lead to the separation of coarse graphite with consequent loss of strength.

An Objectionable Labor Bill

WASHINGTON, D. C., March 28, 1916.—The House Committee on Labor, on March 23, authorized a favorable report on bill H. R. 8665, introduced in the House Jan. 11, 1916, by Representative Tavenner, of Illinois, prohibiting the use of scientific shop management methods in any Government establishment. Representative Keating, of Colorado, was assigned to prepare the committee's report. Immediately after the announcement of the action of the committee, however, Chairman Lewis received a request from a representative of the National Association of Manufacturers for a hearing on the bill. It is understood that this request will be complied with and that the whole subject, therefore, will be reopened.

The Tavenner bill, which proposes to extend to all Government establishments the prohibition of scientific shop management systems which was incorporated in the last annual army and navy appropriation acts, provides as follows:

> That it shall be unlawful for any officer, manager, superintendent, foreman, or other person having charge of the work of any employee of the United States Government to make or cause to be made with a stop watch or other time-measuring device a time study of any job of any such employee between the starting and completion thereof, or of the movements of any such employee while engaged upon such work. No premiums or bonus or cash rewards shall be paid to any employee in addition to his regular wages, except for suggestions resulting in improvement or economy in the operation of any Government plant.

The Tavenner bill is strongly opposed by several national organizations of business men, including the Chamber of Commerce of the United States, which has authorized the appointment of a committee to oppose Federal legislation of this character. Manufacturers who desire to be heard against the Tavenner bill should lose no time in communicating with the chairman of the Labor Committee, Representative David J. Lewis, of Maryland.

W. L. C.

On the hypothesis that iron, steel and alloy castings become stronger by ageing for a number of months or years, a patent (U. S. 1,164,487—Dec. 14, 1915) has been granted to H. E. Field and F. C. Daniels, Wheeling, W. Va., by which they accomplish the results of ageing in a short time and by certain heat treatment.

PENNSYLVANIA SAFETY PLANS

Important Conference of Industrial Representatives Held at Harrisburg

At the call of the State authorities a conference of about 400 representatives of Pennsylvania industrial plants was held in the hall of the House of Representatives, Harrisburg, March 23, to devise means for reducing industrial accidents. At the present rate, it is estimated that 300,000 employees will be disabled the present year.

The morning session began at 10 o'clock and included addresses by Governor Brumbaugh; John Price Jackson, Commissioner of Labor and Industry, on "The Loss to Pennsylvania's Industries Through Accidents"; Samuel Gompers, president American Federation of Labor, on "Labor's Share in Reducing Accidents," and a general discussion in which many of those present participated. At noon the Governor entertained 107 at luncheon at the Harrisburg Club.

At the afternoon session addresses were made by William C. Wilson, claims attorney for the Delaware, Lackawanna & Western Railroad, on "Railroad Accidents and Their Prevention"; James T. McCleary, secretary of the American Iron and Steel Institute, on "Hazards of the Steel Industry and Their Prevention"; Van H. Manning, director of the United States Bureau of Mines, on "Mine Disasters and Their Prevention"; C. L. Close, representing the United States Steel Corporation, and a number of others. It was decided that committees to take up safety measures for the various industrial branches should be appointed by John Price Jackson, Commissioner of Labor and Industry, to be subject to call. Pittsburgh, Harrisburg and Philadelphia were designated as the places for holding the meetings, it being planned to call the committees together either as a whole or separately, to take action on any suggestion that may be made from time to time for accident prevention or safety devices for the various industries. The committees were appointed as follows:

Steel Trades.—Quincy Bent, Pennsylvania Steel Company; C. W. Heppenstall, Heppenstall Forge & Knife Company, Pittsburgh; William B. Dickson, Midvale Steel & Ordnance Company, New York.

Coal Mining.—Robert A. Quinn, Susquehanna Coal Company; John B. Kerr, Scranton Coal Company; H. A. Taylor, Pittsburgh Coal Company.

Railroads.—L. F. Loree, Delaware & Hudson; W. H. Truesdale, Delaware, Lackawanna & Western; C. H. Ewing, Philadelphia & Reading.

General Industrial Plants.—Paul Thompson, United Gas Improvement Company, Philadelphia; W. F. Lowry, American Car & Foundry Company, Berwick; Herbert Lloyd, Electric Storage Battery Company, Philadelphia.

Resolutions were passed pledging the support of those present to the movement and pointing out that 22 industrial plants had reduced accidents 58 per cent by persistent efforts toward "Safety First."

Among those who participated in the various discussions were: Homer Wood, Jr., and Wilbur Collins, Alan Wood Iron & Steel Company, Philadelphia; W. F. Lowry, American Car & Foundry Company, Berwick; G. M. Cooper, American Bridge Company and American Sheet & Tin Plate Company, New York; D. G. Scott, American Iron & Steel Mfg. Company, Lebanon; G. T. Fonda, Bethlehem Steel Company, South Bethlehem; J. C. Davies, Cambria Steel Company, Johnstown; H. D. Williams, Carnegie Steel Company, Pittsburgh; Joseph H. Pendleton, Carpenter Steel Company, Reading; J. W. Dougherty, Crucible Steel Company of America, Pittsburgh; L. A. Way, Duquesne Steel Foundry Company, Pittsburgh; James S. Lanahan, Fort Pitt Malleable Iron Company, Pittsburgh; D. H. Tracy, Harrisburg Pipe & Pipe Bending Company, Harrisburg; S. W. Shaw, Jones & Laughlin Steel Company, Pittsburgh; Newell C. Bradley, Midvale Steel Company, Philadelphia; Quincy Bent, Pennsylvania Steel Company, Steelton; William B. Dickson, Midvale Steel & Ordnance Company, New York; D. P. Bennett and C. J. Morgan, Pittsburgh Steel Company, Pittsburgh; L. S. Wright, Pressed Steel Car Company, Pittsburgh; Henry C. Esling, J. G. Brill Company, Philadelphia; S. Horace Disston and Hamilton Disston, Henry Disston & Sons, Phila-

delphia; Edward G. Steinmetz, Electric Storage Battery Company, Philadelphia; C. W. Heppenstall, Heppenstall Forge & Knife Company, Pittsburgh; R. S. Hubbard, Harrison Bros., Inc., Philadelphia; J. D. Jones and H. S. Wardner, New Jersey Zinc Company, Palmerton.

The United Mine Workers were represented by a delegation of eight. Samuel Gompers, of the American Federation of Labor, headed a delegation of 18 labor leaders representing practically every branch. Ten coal and coke company representatives and 17 railroad representatives were also present, while 19 State officials, including members of the Public Service Commission, were in attendance.

U. S. Cast Iron Pipe Report

The seventeenth report of the United States Cast Iron Pipe & Foundry Company covers only the seven months ended Dec. 31, 1915. This is due to the changing of the company's fiscal year, which had previously ended May 31. The earnings for the seven months show a distinct improvement over the earnings of the twelve months covered by the sixteenth report. The income account for the two periods compares as follows:

	Seven Months to Dec. 31, 1915	Year Ended May 31, 1915
Earnings from operations, after deducting cost of manufacturing and selling, maintenance, administration and provision for taxes and doubtful accounts	$370,918.73	$211,267.46
Other income—interest on bank balances and accounts, discounts, etc.	46,643.34	107,804.06
Total	417,562.07	319,071.52
Reserve for improvements	56,000.00	96,000.00
Balance	361,562.07	223,071.52
Interest on bonds, etc.	55,774.10	147,472.39
Net gain	$305,787.97	$75,599.13

Going back still further, the above balances compare with a deficit of $59,867.83 for the year ended May 31, 1914. The balance sheet as of Dec. 31, 1915, is as follows:

Assets		
Property and plant		$24,255,937.73
Cash with trustee, A. P. & F. Co. bonds		24,043.44
Cash on deposit and on hand		702,995.91
Accounts and notes receivable		1,384,325.49
Inventories of raw materials, manufactured product, etc.		3,024,073.62
Total		$29,391,376.19
Liabilities		
Preferred stock		$12,000,000.00
Common stock		12,000,000.00
American Pipe & Foundry bonds		849,000.00
Dimmick Pipe bonds		179,000.00
Accounts and bills payable		1,681,340.24
Accrued taxes, interest, etc.		31,725.33
Reserves:		
Improvements	$218,452.09	
Insurance	117,146.51	
Doubtful accounts, etc.	55,907.39	391,505.99
Surplus:		
Working capital reserve	$1,700,000.00	
Profit and loss account	558,804.63	2,258,804.63
Total		$29,391,376.19

From the accompanying remarks of President L. R. Lemoine the following extracts are taken:

"During the seven months under consideration the company's business improved materially with respect to earnings in spite of a decrease in tonnage as compared with the last seven months of 1914. The favorable net result followed further reductions in operating costs and timely purchases of your chief raw material—pig iron; and is also in part due to the upward trend of the iron and metal markets which has favorably affected the prices for your product. Obviously, the company has not participated in the business resulting from the extraordinary demands of Europe for munitions and other supplies. Its plants are not adapted to the making of war munitions; and partly because of the war, perhaps, the demand for its product from its chief users, namely, municipalities, gas companies and railroads, has been light over a longer period than ordinarily obtains.

"With the outbreak of the European war your business, in common with nearly all lines, suffered sudden and severe curtailment. Under normal conditions, as a general proposition, your business is one of the last to be depressed and one of the last to feel improvement, in that the demand for your product naturally follows chiefly the growth of cities and towns; which, as is well known, has been materially checked during the past two or three years. There is now a noticeable tendency to revive building operations, and as a result the demands on water supplies are here and there being so augmented as to compel attention, so that just now the volume of inquiry at least is markedly ahead of what it has been for some time, and the outlook for business is most encouraging.

"The close of the fiscal period finds the company well provided with raw materials and supplies on hand and to come in, purchased at advantageous figures.

"The remodeling of the Bessemer works, including the addition of a new machine shop, is now being rapidly rounded out. During the seven months upward of $200,000 has been expended for these Bessemer improvements. The progress of this work was seriously interfered with because of delays on the part of contractors and others, whose facilities have been more largely affected by demands growing out of the war. During 1915 some further progress has been gained in the general plans of the managers to centralize the output in fewer plants without decreasing the capacity and to improve its methods of manufacture.

"The accompanying financial statement and balance sheet show that the company continues in excellent financial condition, with a net working capital Dec. 31, 1915, of $3,398,329.45 as compared with $3,273,435.94 on May 31 last."

Pennsylvania Engineers Celebrate

The Engineers' Society of Pennsylvania celebrated its twelfth anniversary and held its second annual banquet at the Harrisburg Club, Harrisburg, Pa., March 25. More than 200 were present. Henderson Gilbert was toastmaster. As a special feature of the occasion, J. V. W. Reynders, who recently resigned as vice-president of the Pennsylvania Steel Company and general manager of its Steelton plant, was presented with a costly silver loving cup in recognition of his conspicuous service, first as head of the bridge department of the Pennsylvania Steel Company and later in the development of important improvements and new construction at Steelton, giving the blast furnace and steel plants their present high standing. Mr. Reynders has been prominent also in community affairs and in engineering and industrial forward movements.

The principal speakers were R. Boone Abbott, division superintendent of the Philadelphia & Reading Railroad; J. V. W. Reynders, Flaviel Wright, Frederick W. Fleitz, former deputy attorney-general of Pennsylvania, and Thomas Earle, superintendent of the frog and switch department of the Pennsylvania Steel Company.

The Engineers' Society of Pennsylvania now has a membership of over 700. It occupies its own handsome building at the corner of Front and Chestnut streets, Harrisburg, overlooking the beautiful Susquehanna River and River Front Park. Under the name of the Engineers' Club of Central Pennsylvania, the organization was born in 1904. Its membership was limited principally to engineers connected with the Pennsylvania Steel Company. Shortly afterward rooms were secured at Second and Walnut streets. J. V. W. Reynders was president. He was succeeded by George W. Parsons, of the Pennsylvania Steel Company, in 1905. In 1908 the membership had grown so large that it was necessary to rent three floors of a large Market Street building. In 1909 it was decided to enlarge the scope of the society's activities and the Engineers' Society of Pennsylvania was organized. F. Herbert Snow, chief engineer to the Public Service Commission, was then president.

In June, 1909, the society held its first convention of engineers of the State in the hall of the House of Representatives and its first industrial exhibit in Chestnut Street hall. These functions were so successful that they have been repeated each year since, being enlarged in the past three years to include safety

and welfare exhibits under the auspices of the various departments of the State government. In 1913 the society purchased its present building and had it remodeled extensively. The house affords excellent facilities of the usual club character. The growth of the society's activities made it necessary to have a paid manager, and in 1915 Paul Gendell, a member who had charge of the exhibits in connection with the conventions, was chosen for the position. The society publishes the *Journal* of the Engineers' Society of Pennsylvania, a monthly publication devoted to the interests of members and the profession in general. The presidents of the society since its organization have all been men of prominence in the engineering profession

Otis Elevator Company's Year

An exception to the highly favorable annual reports of industrial companies now appearing is that of the Otis Elevator Company, whose earnings fell off considerably in 1915. The income account for the year ended Dec. 31, 1915, compares as follows with the previous year:

	1915	1914
Net earnings	$735,669	$876,425
Preferred dividends	390,000	390,000
Balance	345,669	486,425
Common dividends	318,575	318,765
Balance	27,094	167,660
Depreciation and reserve	.....	145,000
Surplus	$27,094	$22,660

President W. D. Baldwin makes the following comments on the year's showing:

"The continued diminution of building operations resulted in a marked decrease of the company's business for 1915. With the small volume of sales in the first half of the year, our factories were operated on short time, and it was only during the later months that factory operations approached full time. The company has not undertaken any orders for war munitions, but has been able to secure work other than elevator machinery, suited to its equipment, which, together with the increasing demand for elevators, has made it possible to operate its factories since the first of this year on a more satisfactory basis.

The operations of the foreign companies have naturally been restricted in their regular work by the war, but all have to a greater or less extent been occupied in the manufacture of other articles required by their respective governments. During the past year the directors have firmly established under its own name the business of the company in South American countries where they had been represented by agents, and our business outlook in those countries is most favorable.

"The capital required for our European business, the acquisition of the South American business, and the increase in the volume and prices of stocks of raw material purchased and made up during the latter part of the year have involved an increase in the bills payable of the company over those of the preceding year. To obviate making short time loans, your directors have arranged, on favorable terms, to issue notes at one and two years to take up the present notes as they mature."

Owing to the great increase in its business, the Files Engineering Company, Inc., Providence, R. I., has leased larger quarters for its Bridgeport shops and offices at Water Street and South Avenue, Bridgeport, Conn. The Bridgeport office has recently closed contracts for heating and power piping with Harvey Hubbel, Inc., Bryant Electric Company, Bullard Machine Tool Company, and Lake Torpedo Company, Bridgeport; Waterbury Ingot & Casting Company, Waterbury, and the British-American Company, Springdale, Conn. A. B. Pinkham, formerly with the Hooper-Falkenau Engineering Company, New York City, is district manager.

The General Electric Company has placed orders for cranes with the Cleveland office of the Whiting Foundry Equipment Company, comprising two 10-ton, a 30-ton and a 50-ton, for the new building in connection with its plant at Erie, Pa.

Brass Manufacturers' Spring Meeting

The spring meeting of the National Association of Brass Manufacturers was held at Hotel La Salle, Chicago, March 22 and 23. The association has held many successful meetings, but none that surpassed this one in numbers and enthusiasm. A feature especially commented upon was the great number of non-members or "outside" manufacturers who were present on the invitations extended.

An important discussion took place on costs at the present time as against what they were a year or more ago, or under normal conditions. In this discussion a matter brought out, which served to open the eyes of those present, was the tremendous cost of crucibles. A prominent manufacturer reported an advance on a certain kind of crucible from $10 to $24 and a loss in efficiency of from 25 heats to four, on the average, which altogether showed first the increased cost to the manufacturer of 140 per cent, then the loss in efficiency of about 84 per cent, a total increased expense, on this one item alone, of around 224 per cent. Other increases in materials and supplies, as well as in the cost of raw metals and the added expense to the manufacturer in the matter of increased wages, were so presented as to make the situation almost alarming and certainly worthy of his most serious consideration. Taking all these things into account, it was the opinion of the meeting that an ordinary standard compression bibb, for example, cannot be sold at a better price to-day than 75 per cent discount and even then there is little if any profit for the manufacturer. It was the consensus of opinion also that copper would be higher and hard to obtain.

Resolutions of interest to the trade were adopted, among which was one that on all orders shipped by parcel post or express the minimum charge for merchandise be 15 cents and a proper charge which shall include the amount of actual postage or expressage; a charge for insurance of delivery of the package and service covering the labor and expense incident to all parcel post and express shipments. Another reaffirmed the position and order passed at the Cleveland meeting in September, 1914, that on direct shipments to points other than the customer's home address no freight allowance will be made. A third set forth that when orders have been correctly filled, a manufacturer cannot allow the return of goods, unless a full explanation has been made and his consent obtained. If accepted, all goods must be returned in a salable condition, so that they may be sold as new goods, and will be credited at not less than 10 per cent for service and rehandling charge, plus shipping expenses. A fourth resolution was that the policy of allowing reverse telephone charges and charges on "collect" telegrams is a bad one and contrary to the interests of the business, and will not be permitted.

The next meeting will be held in Detroit June 14 and 15.

A New Zinc Plant

J. E. Hildt, cashier of the Producers' State Bank, Tulsa, Okla., and formerly a railroad engineer and contractor, is about to build a zinc plant employing the conventional retort process. Associated with him are a zinc smelter man, also the former chief engineer of a large zinc company and a metallurgist who recently installed and put in operation a zinc refinery which is making spelter analyzing 99.91 per cent pure. Contracts for material and machinery are now being placed. A part of the plant will be pushed to completion and the final plant will be laid out with all labor-saving improvements. The first product will be a high grade spelter and later prime Western and brass mill special grades will be produced also. Later a plant to extract the gold, silver, copper and lead values is contemplated and possibly a plant to make 98 per cent sulphuric acid for oil refineries.

The Chester Shipbuilding Company, Chester, Pa., has received orders for 7 ships in addition to the 7 it has already contracted for. Negotiations are being made with the city of Chester to close some streets so as to increase the size of the yard.

Freight on Long or Bulky Articles

WASHINGTON, D. C., March 28, 1916.—The Interstate Commerce Commission has made an order applicable to all lines in official, Western and Southern classification territory providing a uniform minimum charge rule applicable to long or bulky articles. As the result of this order the present minimum charge on iron and steel articles exceeding 22 ft. in length and not exceeding 12 in. in diameter will be fixed at 1000 lb. at the first-class rate for the entire shipment in lieu of a 4000-lb. minimum as heretofore prescribed.

The minimum charge on long or bulky articles has been the subject of litigation before the commission for several years. In March, 1915, the commission prescribed a rule applicable to all carriers parties to the three classifications providing that "a shipment containing articles the dimensions of which do not permit loading through the center side doorway, 6 ft. wide by 7 ft. 6 in. high, without the use of end door or window in a closed car not more than 36 ft. in length by 8 ft. 6 in. wide and 8 ft. high, shall be charged at actual weight and authorized rating, subject to a minimum charge of 4000 lb. at the first-class rate for the entire shipment."

Following the application of this rule by the carriers the commission received numerous complaints from certain shippers setting forth instances in which the rule worked a hardship when applied to their particular kind of freight. Among those filing formal complaints were leading shippers of long iron and steel articles including the Illionis Steel Company, Joseph T. Ryerson & Son, American Rolling Mill Company, National Corrugated Cover Mfg. Company and National Implement & Vehicle Association. Some of the instances recited were so aggravated that the matter was re-opened for further consideration.

In official classification there is an exception designated as note 2, which accords to certain iron and steel articles over 22 ft. in length a minimum charge of 1000 lb. at the first-class rate, regardless of whether the shipments move in box cars, stock cars, gondolas or flat cars. This exception made rule 7 (B) and (C) of the classification, applying a minimum of 4000 lb. at the first-class rate inapplicable. The railroads make no claim that their revenues under the exception are not sufficient and the shippers contend that the rule is reasonable. No claim has been made that this exception operates as a discrimination in official classification territory favorable to iron and steel articles and prejudicial to other articles.

Concerning the 4000-lb. minimum, however, the evidence with regard to iron and steel articles is very convincing that where an article is long and light and the other articles in the shipment are not of sufficient weight the application of the minimum charge rule is a severe burden on the movement of this traffic. In most instances these long light iron and steel articles cannot be bent or otherwise packed to permit of ordinary handling. If they are bent they lose their tensile strength and are not suited for the purpose for which they are intended. The shippers of this material therefore suggested to the commission an exception to the rule to be applied in Western and Southern territories practically the same as note 2 to official classification, with the size of the car, however, limited to 40 ft. instead of the ordinary car of 36 ft., as adopted in the original report in this matter. In deciding to extend the official classification exception to Western and Southern territories, the commission says:

> It does not appear from the testimony what is the size of the end doors or windows available for loading in the different classes of inclosed equipment owned by the carriers as given heretofore in this report, but granting that these end windows will average at least 2 ft. by 2 ft., it appears that the largest width or diameter of a rigid article over 22 ft. long that may be loaded through a 6-ft. center side door of a 36-ft. car with the aid of such an end window is 12 in. Any minimum charge rule is necessarily somewhat arbitrary, but in arriving at the exception hereinafter prescribed to the uniform rule we attempt to fix a minimum charge, which will on the one hand yield the carriers an average adequate revenue, and on the other hand make applicable a rate under which the particular traffic may move without an undue burden. From a consideration of all the facts and circumstances the commission is of opinion and finds that in addition to the rule heretofore prescribed, the carriers parties hereto shall publish an exception to that rule which is hereby found to be reasonable, as follows:
>
> "Unless a lower rate is otherwise provided, a shipment which contains an article exceeding 22 ft. in length and not exceeding 12 in. in diameter or other dimension shall be charged at actual weight and authorized rating, subject to a minimum charge of 1000 lb. at the first-class rate for the entire shipment."

The new rule takes effect May 1 and will apply to all articles of the specified dimensions, whether of iron, steel or other material. W. L. C.

Providence Engineers Reorganize

The Providence Association of Mechanical Engineers, Providence, R. I., at a meeting held March 22, voted to change its name to Providence Engineering Society. The membership will include civil, electrical, mechanical, chemical, architectural and other engineers. The plans for the new organization were outlined by a committee headed by Luther D. Burlingame, Brown & Sharpe Mfg. Company, and the details will be voted upon and changes in the constitution made at the next meeting. One feature of the plans is the division of the society into sections representing the different branches of engineering, each section to have its own officers. It is expected that the reorganization will permit the engaging of more suitable quarters, the development of better facilities for the publication of papers and create better opportunity for co-operating in civic matters of an engineering nature. At the meeting, J. W. Hook, general manager, C. A. Dunham Company, Marshalltown, Iowa, gave an address on "Vacuum Steam Heating."

Another Furnace on Ferromanganese

Announcement has already been made that E. J. Lavino & Co. of Philadelphia have purchased the Sheridan furnace of the Berkshire Iron Works, Sheridan, Pa., and will make 80 per cent ferromanganese, using Brazilian ores. The same interests have a conversion arrangement under which the Meily furnace at Lebanon, Pa., will be started up to make ferromanganese. E. G. Rust will have the management of the two furnaces.

The Kohler Company, Kohler, Sheboygan County, Wis., a large manufacturer of enameled plumbing ware, on March 1 instituted a bonus plan based on perfect attendance to stimulate employees to be prompt in reporting for work. Each employee will be given a bonus of 10 per cent of his total monthly wage or salary for perfect attendance, the payment to be made on the 25th of the month following. The plan covers every person, from executives to apprentices.

New York bankers have been at work on a plan for another reorganization of the Sheffield Coal & Iron Company, which has two blast furnaces and 225 coke ovens at Sheffield, Ala., and brown ores in Alabama and Tennessee. The proposal is to secure $1,000,000 of new capital by issuing new securities to the present bondholders and stockholders. Interest on the outstanding bonds has been unpaid since 1911.

The Ranken Trades School, St. Louis, Mo., closed its night school period for the season last week with a reception for the inspection of the work done by the 400 students of the institution. The day school operates eleven months in the year, under the direction of Lewis Gustafson, and its curriculum has, since the endowment of the institution, proved its practical character in all the courses taught.

The largest recorded output of rutile, which is titanium oxide, in the United States was produced last year by the American Rutile Company at its plant at Roseland, Va. It was valued at $25,000 to $30,000. Ilmenite was also produced. Both ores are used in making ferrotitanium.

E. W. Bliss Company's Large Earnings

The report of the financial results of the operations of the E. W. Bliss Company, Brooklyn, N. Y., for the year ended Dec. 31, 1915, has been made public. The income account is as follows:

Net earnings	$5,532,101
Preferred dividends	100,000
Balance	5,432,101
Common dividends	250,000
Balance after dividends	5,182,101
Previous surplus	2,243,047
Surplus, Jan. 1, 1916	$7,425,148

In 1914 earnings for the common stock were about $900,000. The balance sheet is as follows:

Assets

Cash assets, and bills receivable	$7,149,482
Advanced payments	454,501
Paris and London offices	621,617
Outside investments	872,096
Real estate, buildings, equipment	3,969,364
Letters patent	1,023,341
Inventories	4,416,441
Total	$18,506,842

Liabilities

Accounts payable, accrued wages and salaries	$2,189,411
Advances received on contracts not filled.	5,643,483
Bonds	748,800
Preferred stock	1,250,000
Common stock	1,250,000
Surplus	7,425,148
Total	$18,506,842

General Electric Bonuses

The General Electric Company has announced to the 60,000 employees of its various plants that it will pay to all employees of five years' service with the company a bonus of 5 per cent of their earnings. Payments for the first six months of 1916 will be made on or before Aug. 1, 1916, and for the last six months of the year on or before Feb. 1, 1917. It is expected that similar payments will be continued as long as the company's financial condition warrants, but no definite promise is made beyond the period stated. No figures on the number that will benefit at the Schenectady, N. Y., plant are available, but it has been estimated that about 4000 at the Lynn, Mass., plant and about 2000 at the Pittsfield, Mass., plant will profit by the additional bonus. Some of the smaller plants, such as the one at South Windsor, Conn., also have a considerable number of employees who will benefit.

On Jan. 1 the company granted an increase of 5 per cent in wages and shortened the working time two hours a week. Last year it gave many of its older employees a vacation with full pay.

Women in Oxy-Acetylene Welding

Oxy-acetylene welding is the latest work to attract female labor in England, an industry itself in its earliest stages. The success in the introduction of women into British industries and vocations calling for much skill has been remarkable in the last eighteen months, remarks an English paper, and every day seems to bring a fresh surprise in this direction. Ever since the active service branch of the National Union of Women's Suffrage Societies was formed it has kept to the fore a program of practical effort and last September the first school for the teaching of welding to women was opened. Six weeks' training is usually enough to equip a girl to take her place in a plant. Even before the war there was not an abundance of men doing this work, for the temptation with them when they had attained proficiency was to go the still better paid labor of cutting metal with oxygen.

At the annual meeting of the Temple Iron Company, Reading, Pa., March 21, D. E. Loomis, New York, and Isaac Heister, Reading, were elected new directors. Directors re-elected were E. T. Stotesbury and E. B. Thomas, Philadelphia; F. C. Smink, Reading; W. J. Richards, Pottsville; W. H. Truesdale, F. P. Underwood and Robert W. Deforest, New York.

BRITISH STEEL EXPORTS LARGE

February Exceeds the Average for 1915, with Imports Less

British iron and steel exports continue larger than those for 1915 despite the efforts to curtail them by embargoes. In February they were 283,250 gross tons, excluding iron ore and including scrap, as compared with 292,203 tons in January. In February, 1915, the total was 198,804 tons, while the monthly average for 1915 was 270,858 tons.

Pig-iron exports continue very large, those for Febbuary being 71,314 tons against 70,313 tons in January, this year, and 19,726 tons in February, 1915. France and Italy continue to take the bulk, the former receiving 31,516 tons and the latter 22,312 tons of the February total.

Exports of steel bars continue heavy—56,917 tons in February against 33,397 tons in February, 1915. Last month France took 46,910 tons of the total.

February ferromanganese exports were larger than for some months—about 13,000 tons, against about 8000 in January. The monthly export rate in 1915 was about 8500 tons. Rail shipments were only 3905 tons last month against 14,877 tons in February, 1915, and a monthly rate of 20,190 tons last year. The galvanized sheet exports were 14,334 tons against the monthly average in 1915 of 23,870 tons. Tin-plate exports in February were 27,289 tons as compared with 26,271 tons in January. They are still below the monthly average for 1915.

Imports of iron and steel in February were less than in January having been 76,125 tons against 81,248 tons. In February, 1915, they were only 51,994 tons, though the monthly average last year was 107,944 tons. February imports of blooms, billets and sheet bars were only 13,203 tons, indicating a shortage in the American supply. The monthly average in 1915 was 35,666 tons.

Iron-ore imports in February were 403,973 tons, compared with 526,269 tons in January. To March 1, 1916, the total was 930,242 tons against 746,309 tons to March 1, 1915.

Electric and Crucible Steels at Sheffield

The use of electric furnaces in Sheffield, England, previous to 1915 was limited and not more than ten were being operated in all the steel works, according to Consul John M. Savage, of Sheffield. In 1915 at least fifteen additional electric furnaces were installed or in process of installation. Other manufacturers now have the erection of such furnaces under consideration. Their introduction has resulted in a much increased output of alloy steel for automobiles, aeroplanes and small castings and the present demand for these types of steel is large.

Experiments in melting high speed steel in electric furnaces do not convince Sheffield manufacturers that this process produces as good a steel as that obtained by the crucible process, which has been in use so many years. The principal objection to the electric process is the size of the melts. It is claimed better results are obtained in teeming the smaller quantities handled by the crucible process.

The prevention of corrosion in pipe was the subject of a paper presented before the American Society of Heating and Ventilating Engineers at its last meeting by F. N. Speller, metallurgical engineer of the National Tube Company, Pittsburgh. The author holds that developments in the metallurgy and manufacture of steel pipe promise to add 50 or perhaps 100 per cent to the life of pipe compared with the service obtained under like conditions ten or twelve years ago, but he believes that it is well within the bounds of possibility to predict that de-aeration of the water, through the use of plants designed with this end in view, should at moderate expense increase the life of some piping systems four or five times. The paper has been printed in pamphlet form for general distribution by the National Tube Company, Pittsburgh.

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Financial Preparedness of Steel Makers

It is common knowledge that all the steel makers are committed to a policy of maintaining a large volume of quick assets at this interesting time in the steel industry's history. The suddenness with which profits have mounted in recent months has not made the steel interests less conservative, but rather they have become more conservative. They will emerge from this period of intense prosperity with vastly greater reserves than ever before in their history. Indeed, it is probably safe to estimate that even at the beginning of this year the steel makers as a whole had larger reserves than ever before, while of course these reserves are being added to month by month.

It may be of interest to note the United States Steel Corporation's position on Dec. 31, 1915, according to the annual report just published, details from which appeared in THE IRON AGE last week. The cash on hand, $94,083,805, was the largest in the corporation's history, and by $27,000,000 the largest reported for the close of any year, there having been $67,153,564 at the end of 1912. The steel market was in somewhat the same stage at the end of 1912 as it was passing through at the close of 1915. The chief divergence has occurred this year, as a matter of fact, for there has been great improvement in the past three months, while there was no measurable improvement at any time in 1913. Thus a comparison between conditions at the close of 1912 and 1915 respectively is particularly illuminating. There was an increase in the inventory from $152,000,000 to $161,000,000, but the iron ore in the inventory decreased from $62,000,000 to $46,000,000, so that the "quick sellers" have largely increased. The intercompany profits, not carried on the balance sheet or in the regular statement of earnings, and thus in substance an addition to the stated reserve or surplus, increased from $15,547,000 to $20,110,000.

The surplus net income for 1915, after payment of dividends, was $44,260,374. Only two years—1906, with $63,000,000, and 1907, with $69,000,000—showed larger surpluses, but in both those years there were large special appropriations for new construction, whereby the untouched surplus of 1915 was by far the largest in the corporation's history. As a matter of fact the increase in cash during 1915 was $32,120,518, or 73 per cent of the surplus earnings shown. It is altogether uncommon for the surplus earnings of a large corporation to be represented in "real money" to such a large extent, particularly when the volume of business has expanded so rapidly.

Thus the Steel Corporation strengthened its position very materially even before the beginning of this year and with the large earnings now being realized its position is being further strengthened at a rapid rate. The present new construction program, while apparently quite extensive, is not large in proportion to the earnings now being realized, or those in prospect from the filling of definite orders now on books. The cash at the beginning of the year was 90 per cent of the total amount involved for a year in subsidiary company and corporation bond interest and sinking funds, depreciation and extraordinary replacement funds and 7 per cent preferred and 5 per cent common dividends, while even last December the earnings were running almost $10,000,000 a month more than the amount necessary to cover these charges.

Tariff Commission Bill Introduced

At last the proposition to create a tariff commission has taken concrete form. On Monday of this week Representative Rainey of Illinois introduced a bill in the House which had been approved by the majority members of the Ways and Means Committee and which, he stated, had the approval of the President and is to be regarded as the Administration measure on this subject.

This bill provides for the creation of a commission of six members whose salaries shall each be $10,000. The first members are to be appointed for terms of two, four, six, eight, ten and twelve years and thereafter for twelve years. The duties of the commission shall be to investigate the effects of the customs laws of this country, relations between rates of duties on raw materials and finished products, effects of ad valorem and specific duties, arrangement of schedules and classification of articles in the several schedules of the tariff law, tariff relations between the United States and foreign countries, commercial treaties, preferential provisions, effects of export bounties and preferential

transportation, the values of importations compared with domestic products and of conditions, causes and effects relating to competition of foreign industries with those of the United States, including cost of production and dumping.

In introducing the bill Congressman Rainey stated that it was as nearly non-partisan as it is possible to make it and that to save time in its consideration it will probably be added to the omnibus revenue bill. He further stated that the bill would protect in the strongest possible way trade secrets and processes. Any member of the commission or any employee or officer of the Government who divulges or makes known in any manner trade secrets or processes is subjected to severe penalties, while at the same time the bill confers on the commission the very broadest powers of investigation. It is the intention of its sponsors to make this commission permanent. It will constitute a distinct independent establishment of the Government, with duties well defined by law so as to insure not only tariff stability but that whenever revisions of the tariff appear to be necessary the investigations of the commission will make it possible to perform such revisions intelligently.

It would seem that this bill meets the demands fully of the business interests of the country which have for a long time been urging the creation of a tariff commission. Its provisions probably go further than had been expected, especially in the effort to make this body a permanent part of the Government. Having no doubt that the bill will pass both Houses of Congress and become law, the next matter in connection with it that may cause some uneasiness is the character of the appointments to be made. These appointments, which will be made by the President, will either result in the tariff commission becoming a great and strong body of direct influence in connection with tariff legislation or so weak as to do little more than collect masses of figures and pages of valueless data. The President, in selecting his appointments, needs not only his own best powers of discrimination and judgment but also counsel from able men of affairs without regard to party or economic convictions.

Ferromanganese in Germany

Further bulletins from Germany repeat what has been said often since the beginning of the war as to the discovery of a substitute for ferromanganese. It will be recalled that at a meeting of German steel manufacturers more than a year ago Dr. E. Schroedter spoke of the means by which German steel works were able to get on with less manganese than formerly as "their own metallurgical secret." In some of the recent comment on the handling of the manganese situation at German works the fact seems to be overlooked that Germany imported about twice the ordinary amount of manganese ore from Russia and India in the year preceding the war. There was a certain measure of preparedness in respect to manganese similar to the well-known storing up of copper. Whatever German metallurgists have done in devising means of making steel with less manganese or with the "substitute," of which so much has been heard, no doubt the facts will come out in due time.

It is to be considered, however, that the German steel output is only about two-thirds what it has averaged in recent years and that the war began with unprecedented stocks of manganese ore on hand; also that something has doubtless been done in the concentration of ore from Germany's manganiferous deposits. Natural explanations will save the resort to magic arts, that in some directions has been rather overdone.

A Call for Immediate Action

Should an official of the Federal Government attempt to eliminate waste in the public service, he might be jailed under a bill about to be reported to the House of Representatives. This is literally the effect of the bill. It was introduced on Jan. 11 by Representative Tavenner and aims at the prohibition of time study and bonus payments in Government workshops. Violations of the act, such as taking time studies or paying premiums or cash rewards, are deemed a misdemeanor punishable by fine or imprisonment. The bill is one of the latest of the series of attempts to prevent the practice of modern industrial management at arsenals and navy yards and in all Government operations. The probability that just such a measure would be brought forward was forecasted in these columns Nov. 4, 1915, but the urgency for personal work with members of Congress for the defeat of the bill now needs to be emphasized afresh.

With those who have made any impartial study of the scientific system as working to-day, no argument is necessary; but many half-truths and misleading statements have gained credence. For the uninformed and in particular for the Congressmen who have been liberally supplied with the *ex parte* statements of the prejudiced investigators of the Industrial Relations Commission, a group of individuals has been collecting from all over the country data of the experience of employers and employees under scientific management. These facts and figures, which will shortly be put in the hands of congressmen, bear on the health, hours of labor, wages and attitude of the employees, also the cost and quality of output. The collators are representatives of a number of engineering societies with whom the paramount motive is that the United States Government may be prevented from taking so serious a backward step. Manufacturers at the least should write at once to prepare their representatives for these specific proofs of the advantages of scientific management, so that they may be considered fairly. It would be a national disgrace if the reactionary Tavenner proposal should prevail, as its moral effect would inevitably be to add one more to the hobbles American manufacturers are already carrying in the international race.

Rail Prices

Something too much has been printed lately about an agitation among rail manufacturers for an advance in the price of rails. It does not appear that any such advance has had serious consideration either by the Steel Corporation or by so-called independent producers. While the price of rails is quite out of line, in view of the more than doubling

of contract prices for bars, shapes and plates in the past year, it is not to be overlooked that the rail mills are receiving not $28 but $30 a ton at mill for most of the rails they ship. The $28 price, equivalent to 1.25c. per pound, is the base or Bessemer rail price, as is well known, whereas open-hearth rails, which now make up over 80 per cent of the rail production, bring 1.34c. per pound at mill.

After having urged, year after year, in justification of a fairly uniform price of rails, the fact that they had never advanced rails, even though in three well-known movements in recent years the price of billets had gone well above that of rails, the manufacturers would be slow to entertain the idea of a reverse policy. The day may come, however, when rails will take their place with other steel products and be subject to the same vicissitudes. The increasing severity of specifications makes the 1.25c. or 1.34c. level much less attractive than in the old days, for in times of depression rail orders are as infrequent and as little dependable as those in other lines. The thing to which railroad engineers need to give heed, not as a lesson of the present stampede for steel, but as a gradual development in the industry, is that rail business is less a thing to be grasped at since other lines have grown relatively more profitable. That situation is not unlikely to result in an increasing resort to extras to measure the added costs under more and more exacting rail specifications.

Socialized Industry in Europe

Attention has been very widely attracted to the changing position of Great Britain's business interests with reference to free trade. The same exigencies are also bringing out another tendency in her industrial situation, no less marked and scarcely less important in its bearing on our own future activities in export fields.

In a recent article H. G. Wells took up the question how far Europe will go toward socialism. The discussion largely concerned industrial conditions, and the author laid particular emphasis on the wasteful duplication of facilities, the lack of co-operation and the pursuit of profit regardless of national security and welfare, that have been disclosed in the highly individualistic organization of industry as it was at the beginning of the war. He pointed out that the imperative necessities growing out of the demands of the past year have justified a centralized control of hitherto separately operating units. The business of transportation showed the most flagrant conditions and was first to be taken in hand. The same necessity is increasingly evident in manufacturing. The author believes this socialistic control of industry, as at present enforced, is not only a recognition of Germany's progress in mastering the problem of nationally efficient industry, but also a significant prophecy.

Lessons learned now will not be entirely forgotten in the period of convalescence. Not only are Great Britain's immediate needs demanding the co-ordination of all its facilities, but the industry of the nation is already preparing for trade alignments to follow the war, such as will be possible of maintenance and administration only under a centralized organization. The British program now includes trade extension efforts in the post-bellum period, in which co-operation among the now belligerent Allies will be fostered by governmental sanction and support. The outlook is distinctly for a concerted national effort in securing world trade and equally concerted effort to serve that trade most efficiently through the elimination of competitive wastefulness at home.

With this prospect the manufacturers of the United States must reckon in their plans for export trade. If, individually or collectively, the nations now allied in war are to throw themselves into the conquest of markets where, heretofore, enemy countries have been commercially strong, that nationally organized aggressiveness will be equally directed against the trade of this country wherever we may competitively encounter it. Intelligent preparation is therefore the slogan of the hour as the way is now being opened up. The Federal Trade Commission has already taken ground in favor of co-operation by those now planning to establish themselves in the export trade. Recent developments in Great Britain give additional emphasis to the necessity of such co-operation.

Lake Ore Analyses

The annual compilation of average cargo analyses of Lake Superior iron ores has just been issued by the Lake Superior Iron Ore Association. There is quite a sprinkling of new names, and some familiar ores are dropped, so that the net increase is scarcely perceptible. The average iron content of the entire volume of ore shipped is sometimes made the subject of an exhaustive compilation, whereby the variations in analysis of different ores are given their proper weight. From a cursory examination of the Mesaba ores it would appear that there has been a very slight though perceptible decrease in the iron content from the season of 1914 to that of 1915. A few of the ores cannot be compared, but of those that can be 13 are unchanged, 35 show an increase in iron content and 35 a decrease. The volume of decreases preponderates, so that there is the equivalent of a uniform decrease of about two one-hundredths of one per cent distributed over the 83 ores. It may be remarked that this method of comparison from year to year is subject to the distortion that the ore from a small mine may degenerate while the ore from a large mine may improve to the same extent, and the comparison show nothing. But the compilation by tonnage has its own distortion, also, in that a poor ore season brings out the best ores and leaves the poorer in the ground, while in a big season all the ore that can be mined, good or indifferent, is taken.

The Steel Corporation's ores on the Mesaba range show increases and decreases in the various groups, these about balancing. Of other Mesaba ores the largest increase is that in Admiral, from 54.692 per cent iron (natural state) and 0.0327 per cent phosphorus to 57.319 per cent iron, with 0.0324 per cent phosphorus, while Leonard has gone up from 49.74 per cent to 51.80 per cent in iron. It may be observed that many of the particularly low phosphorus ores of the range have gone still lower in phosphorus, without corresponding change in the iron content.

New Company to Produce Ferromanganese from American Ores

The United States Manganese Corporation was incorporated March 28 at Albany, N. Y., by W. R. Hopkins, M. P. Dalton, H. H. Meyers and others to mine and smelt manganese ore. The mine is located at Elkton, Va., and comprises 1000 acres which the new company owns or controls. For the past six months assembling, explorations and drillings on this property have been going on and large quantities of high grade ores are claimed to be assured. Besides selling ore in the market the company has leased a blast furnace for producing ferromanganese. The enterprise has reached the stage where shafts are about to be sunk and ore can be turned out within 90 days. The original capital is nominal, but will be increased to a large amount. The company's offices will be located in New York.

Pittsburgh and Nearby Districts

The freight rate of 65c. per 100 lb. on manufactured iron and steel commodities to apply from Pittsburgh to Pacific coast terminals will become effective April 10. This rate has been authorized by the Interstate Commerce Commission and represents a reduction of eight and nine-tenths cents per 100 lb. on the present rate.

A Pittsburgh interest has contracted to take from the Kittanning Iron & Steel Company, when it starts its blast furnace at Kittanning, Pa., about July 1, 5000 tons of basic iron per month, running over the entire year. The output of the furnace will be between 8000 and 9000 tons per month, so that the company will have some excess iron to sell in the open market. The price to be paid for the iron is to be fixed each month and will be based on the monthly average of quotations on basic iron in the Pittsburgh market report in THE IRON AGE.

The Columbia Steel Company, Elyria, Ohio, is in the market for two double annealing furnaces for the treatment of cold rolled strip steel.

The Carnegie Steel Company, Pittsburgh, placed a contract recently for a double-end machine to cut 2-in. holes through 1-in. plates at one end, and to shear plates at the other end, to be installed in its Homestead steel works, Homestead, Pa.

It is stated that the Pennsylvania Railroad Company will build a hotel in Pittsburgh to cost about $1,000,000. The new structure is to be erected not far from the Pennsylvania station in that city. Steel fabricators have not yet been asked to bid on the material for the proposed new building.

The Mack Foundry & Machine Company, Wilkinsburg, Pa., near Pittsburgh, has been incorporated with a capital of $10,000 to conduct a general foundry and machine shop, manufacturing castings of brass, bronze, monel and aluminum and to machine these. The foundry is equipped to produce about two net tons a day. The machine shop is equipped to handle all sorts of light work, models, etc. A drafting room is being installed. A. C. Mack is president, S. Dale Clarke, vice-president, and John N. Paterson, general manager.

The interests of the J. E. Moss Iron Works and the Architectural Iron & Wire Works, both of Wheeling, W. Va., have been merged into one company to be known as the J. E. Moss Iron Works, and the capital stock will be increased to $250,000. An office building will be erected, and the plants of both companies will be enlarged. Officers elected are as follows: J. E. Moss, president; Jerome A. Moss, vice-president; E. A. Reich, secretary and credit manager; Edward A. Moss, treasurer and sales manager. The company will do heavy structural steel work as well as ornamental iron, wire, brass and bronze work.

On Tuesday evening, March 28, C. G. Atwater, manager of the agricultural department of the American Coal Products Company of New York City, read a paper before the metallurgical and mining section of the Engineers' Society of Western Pennsylvania in its rooms in the Oliver Building, Pittsburgh, on "The Utilization of By-products from the Manufacture of Coke." Mr. Atwater discussed general types of plants for coal distillation, coke as a by-product and the recovery of ammonia, benzol and tar. The paper was illustrated with lantern slides.

Directors of the Trussed Concrete Steel Company, Youngstown, Ohio, have recommended to the stockholders an increase in the capital stock of $1,000,000, or from $2,000,000 to $3,000,000, the increase to be divided equally between common and preferred stock. The stockholders will meet in Youngstown April 4, to take action on the proposition. The purpose of the proposed increase is to provide more working capital and funds to make large additions to the plant.

An additional 10-in. bar mill has been placed in operation at the Haselton works of the Republic Iron & Steel Company, Youngstown, Ohio. The mill was removed from its works at Moline, Ill., and has been overhauled and equipped with new rolls. The cooling bed was lengthened, and the mill is now running on double turn.

The Watt Mfg. Company, Pittsburgh, with a capital stock of $10,000, has been incorporated by Lewis R. Watt, 236 Zara street, Pittsburgh; L. Arnold Watt, Pittsburgh, and Walter C. Uhling, Baden, Pa., to manufacture ornamental iron work.

The Wagner Electric Mfg. Company, St. Louis, has removed its Pittsburgh office to 947 Penn Avenue, Ludwig Hommel continuing in charge.

The Woodard Machine Company, Wooster, Ohio, has been incorporated under the laws of Ohio with a capital of $150,000. One of the incorporators is L. A. Woodard, formerly vice-president and general manager of the William Tod Company, Youngstown, Ohio. Some time ago Mr. Woodard purchased the plant of the Canton-Hughes Pump Company at Wooster, and has organized the above named company to operate it. It is said some new lines of product will be added to the plant, and it will be enlarged.

The National Foundry Company, Erie, Pa., is taking bids for a one-story addition, 96 x 120 ft., to be made to its foundry at Raspberry and Fifteenth streets. E. W. Sheldon is general manager.

Cambria Steel Company Appointments

It was announced at the office of A. C. Dinkey, president Cambria Steel Company, Widener Building, Philadelphia, March 27, that John C. Neale had been appointed general manager of sales of the Cambria Steel Company, vice C. B. McElhany, resigned. Mr. Neale will have complete charge of all sales matters of the Cambria Steel Company, Midvale Steel Company and Worth Brothers Company. He will be located at the general offices of these companies in the Widener Building.

It also was announced that J. M. Milliken had been appointed auditor of the Cambria Steel Company and the Worth Brothers Company, vice H. W. McAteer, who resigned from the position of comptroller of the Cambria Steel Company. This appointment also becomes effective April 1, and Mr. Milliken will be located in the Widener Building.

New Control of American Steel Export Company

C. B. McElhany, who has resigned as general manager of sales of the Cambria Steel Company, and H. W. McAteer, who has resigned as comptroller, have secured control of the American Steel Export Company, Philadelphia, by the purchase of 58 per cent of the stock which was held by the Midvale Steel & Ordnance Company and formerly by the Cambria Steel Company. The main office of the company is now in the Morris Building, Philadelphia, but it will be removed to New York. The Philadelphia office will be retained as a branch.

The Seattle Construction & Dry Dock Company, Seattle, Wash., has received a contract from the Luckenbach Steamship Company, New York, for the construction of a steel steamship to cost about $1,000,000. The vessel will be of 11,000 tons, dead weight, 470 ft. long, 55-ft. beam and equipped with the latest type of turbine engines.

OBITUARY

Max M. Suppes

Max M. Suppes, general manager of the National Tube Company at Lorain, Ohio, and prominently identified with the steel industry in Lorain ever since the establishment of the steel plant in that city by Tom L. Johnson and his associates 22 years ago, died March 27 at his home at Elyria, Ohio, after an illness of six weeks of Bright's disease and heart disease. He was born in Johnstown, Pa , in 1856, and attended the pub

MAX M. SUPPES

lic schools there. He learned the machinist's trade and developed a high degree of mechanical ability. For about 10 years he was associated with Robert W. Hunt at Troy, N. Y., at the Rensselaer Steel Works in the capacity of master mechanic, and while there had a great deal to do with designing the first automatic rail mill for rolling T rails. Returning to Johnstown he became associated in 1888 with the late Tom L. Johnson and A. J. Moxham of the Johnson Steel Rail Company as master mechanic and later as manager of the rolling mill department. Here he had an important part in the development of the rolling of girder rails. In 1894 he was appointed general manager and placed in charge of the designing and building of the new plant at Lorain, Ohio, which was built by Messrs. Johnson and Moxham, and was operated by the Lorain Steel Company. Later this company was taken over by the Federal Steel Company and in 1901 became a part of the United States Steel Corporation, the plant being transferred to the National Tube Company. The blast furnace and ore receiving docks at the Lorain plant were built under Mr. Suppes' direction and various speed and labor saving devices designed by him were incorporated at both the furnaces and steel plants. He was a member of the American Iron and Steel Institute. He leaves two sons and two daughters.

JOHN S. FRAY, Bridgeport, Conn., founder of the John S. Fray Company, manufacturer of hardware, died at his winter home, Daytona, Fla., March 21, aged 83 years. He was born in Cambourne, England.

COL. H. ASHTON RAMSAY, who established the Baltimore branch of the American Bridge Company, died from pneumonia at his home in Baltimore, Md., March 25, aged 81 years. He was chief engineer on the Confederate ironclad Merrimac during its short career and later served as a Confederate officer. He was born in Washington, D. C. At the close of the war he established the Atlantic Iron Works, Norfolk, Va., and subsequently went to Baltimore, where he started the Vulcan Iron Works and still later founded the Baltimore branch of the American Bridge Company.

HENRY KIRTLAND WICK, a prominent coal operator and capitalist, whose home was in Youngstown, Ohio, died March 22, at Buffalo, N. Y., where he had gone on a business trip. He was born Aug. 31, 1840, in Youngstown. At the age of 16 he became a clerk in the Mahoning National bank and developed into an active business man. He was president of the H. K. Wick Company, Inc., a large coal concern, with headquarters in Buffalo, N. Y., was one of the directors of the Republic Rubber Company, at Youngstown, and also had interests in other local manufacturing concerns there. He leaves his widow and two sons.

EUGENE E. GARVIN, vice-president, Garvin Machine Company, New York City, which was founded by his father, the late Hugh R. Garvin, died at his home in Englewood, N. J., March 20, aged 58 years. He was born in Hartford, Conn., had been connected with the company during his entire business career, and for the past 12 years was vice-president.

SETH H. BUTLER, formerly president of the W. & B. Douglas Company, died at his home in Middletown, Conn., March 23, aged 87 years. He had a long and active career in banking insurance and industrial affairs.

PERSONAL

Charles F. Rand, New York, president of the Spanish-American Iron Company; C. A. Buck and H. S. Snyder, vice-presidents of the Bethlehem Steel Company, and W. S. Bourlier; H. W. Worley, transportation expert of the Bethlehem Company; C. R. Corning and W. L. Cummings, mining engineer of the Bethlehem Company, sailed from New York March 25 for Cuba to inspect the Mayari and other properties of the Spanish-American Iron Company which are now owned by the Bethlehem Steel Company. They will return about the middle of April. For the transport of these Cuban ores to the United States and of coal from this country on return trips, two large vessels are now under construction at Sparrows Point, Md., for the Bethlehem Steel Company, and others are likely to be built.

E. L. Goldschmidt and C. P. Lyman, for a number of years with the Waclark Wire Company, New York City, have resigned and formed a company under the name of Goldschmidt & Lyman, Inc., to conduct a brokerage business in raw metals and manufactured metal products at 90 West Street, New York. Mr. Goldschmidt will handle the raw metal end of the company's business, having had many years' experience in that field, and Mr. Lyman that having to do with manufactured metal products.

Harrison Pendel of South Chicago, Ill., has been made superintendent of the Meily blast furnace at Lebanon, Pa. The stack is now being repaired and new equipment installed.

At a recent meeting of the directors of the Hooven, Owens, Rentschler Company, Hamilton, Ohio, C. Earle Hooven was elected president to fill the vacancy caused by the death of his father, Col. J. C. Hooven. The other officers elected are as follows: Vice-president and general manager, W. B. Mayo; secretary, Don Hooven; treasurer, Gordon S. Rentschler; chairman of the board of directors, G. A. Rentschler.

Charles R. Holton, since 1906 private secretary of J. V. W. Reynders, who recently resigned as vice-president of the Pennsylvania Steel Company and general manager of its Steelton plant, has been made assistant to W. M. Tobias, purchasing agent for the Bethlehem Steel Company, at South Bethlehem, Pa.

Mr. Holton started in the steel business as an office boy in the Edgmoor plant of the American Bridge Company in 1901. He subsequently went to the Ambridge plant, where he rose to the position of chief clerk to the manager. He will assume his new duties in two weeks.

F. L. Cone, for many years superintendent of the Windsor Machine Company, Windsor, Vt., has resigned, effective April 1.

W. A. Thomas, president Brier Hill Steel Company, Youngstown, Ohio, is at White Sulphur Springs, Va., on a vacation.

A. C. Barber, for a long time associated with the sales department of the Moline Plow Company, Moline, Ill., has been appointed manager of sales for the Stephens Six automobile, which the company will manufacture at Freeport, Ill.

C. J. Hopkins of the engineering department of Deere & Co., Moline, Ill., has been appointed production superintendent for Curtis & Co. Mfg. Company, St. Louis, succeeding J. Franklin Irvin, now with the Michigan Motors Company, Flint, Mich.

Frederick C. Moore has opened offices at 710 Engineers' Building, Cleveland, Ohio, to engage in consulting practice as executive engineer. Graduated from Massachusetts Institute of Technology, he has had an experience of many years, in advisory executive capacties having to do with operations of the International Harvester Company, General Motors Company and other concerns having business and operating problems of like magnitude.

Boyd Nixon, for the past nine years with the machinery house of Harron, Rickard & McCone, San Francisco and Los Angeles, Cal., is now connected with the Cleveland, Ohio, district sales office of the Niles Tool Works Company .

Harry C. Greifzu has been elected assistant secretary of the Pulaski Iron Company, Real Estate Trust Building, Philadelphia.

William Arend has been appointed general superintendent of the Cisco Machine Tool Company, Cincinnati, Ohio, succeeding George Spinner.

L. E. Jordan has disposed of his interest in the Vulcan Process Company, Inc., Minneapolis, Minn., and will be succeeded in office by Clifford N. Lockwood, who will fill the positions of treasurer and general manager.

J. C. Drumm, for five years in charge of instruments in the efficiency engineering department of the Carnegie Steel Company, has been appointed supervisor of installation of the efficiency instrument department of the Scientific Materials Company, Forbes Street, Pittsburgh, Pa. He is a graduate of Sibley College, Cornell University.

H. W. Mowrey, American Abrasive Metals Company, 50 Church Street, New York, has been made chairman of the publicity committee of the New York Local Council of the National Safety Council.

Alonzo B. See, A. B. See Electric Elevator Company, New York, has been elected vice-president of the Machinery Club of the City of New York, to succeed the late John A. Hill, publisher of the *American Machinist*. Frederic Stadelman, Wellman-Seaver-Morgan Company, has been elected to fill the vacancy on the board of directors created by Mr. Hill's demise.

A. F. S. Blackwood, who recently resigned as general manager of the Michigan Steel Casting Company, Detroit, has been appointed manager of the Monarch Steel Casting Company in that city. He has been succeeded in his prior connection by A. L. Vaneschen, formerly with the Buchanan Electric Steel Company, Buchanan, Mich.

C. W. LeValley, president of the Chain Belt Company, Milwaukee, Wis., since its organization 25 years ago, retired as active head of the company on March 25 and at a special meeting of the stockholders was elected chairman of the board of directors. William C. Frye, treasurer, was elected president and general manager and will continue as treasurer. Other officers are unchanged, as follows: First vice-president and secretary, William C. Sargent; second vice-president and superintendent, Donald Fraser; third vice-president, Frederick L. Sivyer; directors, C. R. Messenger and Edgar L. Wood.

H. L. Montgomery and C. W. Humphrey, Chicago, have organized a partnership and will engage in a consulting and contracting engineering practice at 327 South La Salle Street. Both are members of the American Society of Mechanical Engineers.

William Vollmer, general superintendent of the Standard Steel Works Company, Burnham, Pa., has resigned. His successor has not yet been appointed.

Lawrence Cooney, formerly of the Ohio works of the Carnegie Steel Company, Youngstown, Ohio, has been made general superintendent of the Algoma Steel Company, Sault Ste. Marie, Ontario. Mr. Conney, previous to going to Youngstown, was connected with the Edgar Thomson works of the Carnegie Steel Company.

Geo. D. McAninch, formerly associated with the accounting department of South works, Illinois Steel Company, has been appointed auditor of the new company organized by Edward M. Hagar to take over the business of the Wright Aeroplane Company and the Simplex Motor Company, New Brunswick, N. J.

C. S. Belsterling, traffic manager of the American Bridge Company, Pittsburgh, has resigned to accept the position of commerce counsel of the United States Steel Corporation. He was presented with a jeweled scarf pin by his business associates and friends.

D. M. Armstead, formerly in charge of the Pittsburgh office of the Ingersoll-Rand Company, New York City, has been transferred to St. Louis, where he will have charge of sales in the St. Louis district. R. H. Cunningham, formerly in the sales department of the New York office, succeeds Mr. Armstead at Pittsburgh.

John R. McGinley of Pittsburgh has been elected a director of the Poole Engineering & Machine Company, Baltimore, Md.

Frank F. Marquard, superintendent of the by-product coke and benzol plant at the Farrell works of the Carnegie Steel Company, has resigned to become general manager of the new by-product coke plant being erected by the same company at Clairton, Pa., which is to have a capacity of 3,000,000 tons of coke per year. He is succeeded at Farrell by Ellis Hilborn, formerly assistant manager.

John R. Stine, for several years head of the production department of the Locomobile Company, Bridgeport, Conn., has resigned to become chief of the routing and controlling department of the Bullard Machine Tool Company in the same city.

M. W. Bartlett, formerly with the Coe Brass Company branch of the American Brass Company, Torrington, Conn., is now secretary of the Splitdorf Electrical Company, Newark, N. J., which is controlled by the Torrington Company.

Donald M. Liddell, recently managing editor of the *Engineering and Mining Journal*, has joined the staff of Merrill, Lynch & Co., 7 Wall Street, New York, as consulting engineer.

T. W. Murray, for some years assistant sales manager of the Trussed Concrete Steel Company, Youngstown, Ohio, has resigned.

James McIlvrid, for years manager of the Cockburn Company and its successor, the Standard Gas Power Corporation, has severed his connection with the latter. He has established the Mutual Iron Works, opposite the West Side Avenue Station of the Central Railroad of New Jersey, Jersey City, N. J., where he will build a complete line of special machinery.

Howard M. Newlin, for some 15 years identified with the Pennsylvania Steel Company, latterly as traffic manager, has been appointed special representative of the Maxwell Motor Company, in charge of freight matters, with headquarters in Detroit. He is president of the Traffic Club of Philadelphia.

INDUSTRIAL PREPAREDNESS

Plan to Have Manufacturers Make Some Munitions in Peace Times

In the manufacture of munitions by the industrial plants of the United States, according to the plan making for national preparedness, the Committee on Industrial Preparedness of the Naval Consulting Board purposes that manufacturers in times of peace shall be commissioned to maintain an annual minimum production of that part best suited to their output. In explanation of this scheme Howard E. Coffin, chairman of the committee, and incidentally vice-president of the Hudson Motor Car Company, Detroit, suggests the case of the committee's going to an automobile company with an order for 10 3-in. shell casings per year to be produced at any time within the year and for such an order every year. The purchasing department of the company, he holds, will learn how and where to buy materials; the manufacturing department will learn how to handle them, and it will become familiar with the necessary jig and tool equipment and with the heat treatment and with the standard of inspection; the engineering department will have the up-to-date blueprints and specifications on file, and all arguments will be gotten out of the way in the period of peace.

In THE IRON AGE of March 23 it was stated at some length what the plan is for organizing for industrial preparedness. Among other things, a committee of five directors in each State will collate the information concerning the resources and capacity of the industrial plants of that State. These boards of directors have practically all been appointed and are representatives of five national engineering societies. The article of last week also reproduced in full the copy of the blank forms which will be submitted to the manufacturers of the country. Through a distribution of orders corresponding to the minimum productive capacity of each plant it is felt that the industrial resources of the war will be developed in a geographical sense, in that it will bring to the support of the army and navy industrial centers west of the Allegheny mountains and away from the exposed seaboards.

TYPICAL EXPERIENCE OF AMERICAN SHELLMAKERS

As indicating the necessity of utmost preparedness Bascom Little, president of the Cleveland Chamber of Commerce, and chairman of the National Defense Committee of the Chamber of Commerce of the United States, recently told of the experience of the company with which he is connected, which got an order for 250,000 3-in. high-explosive shells. "It was a simple enough looking job," he said, "just a question of machining. The forgings were shipped to us and we were to finish and deliver. It began to dawn on us when the forgings came that this whole order, that looked so big to us, was less than one day's supply of shells for France or England or Russia, and we felt that in eight months, by turning our plant, which is a first-class machine shop, onto this job, we could fill the order. In a little while we got up against the process of hardening. That—and mark what I say—was fourteen months ago. To date we have shipped and had accepted 130,000 shells, and those, about half our order, are not complete. They still have to be fitted by the fuse maker, then fitted in the brass cartridge cases with the propelling charge, and somewhere, sometime, maybe, they will get on the battlefield of Europe. Up to the present none of them has arrived there."

TO ADVERTISE THE MOVEMENT

In a statement issued by the Committee on Industrial Preparedness of the Naval Consulting Board, from the Engineering Societies Building, 29 West Thirty-ninth Street, New York City, it appears that the Associated Advertising Clubs of the World have placed their entire organization behind the nation-wide plan of the committee and intend to start an advertising campaign in newspapers and magazines in support of the work of making an inventory of American industry. Herbert S. Houston, president of the organization, says that "Through the great power of advertising we expect to arouse manufacturers, workingmen, business men, in fact the whole country, to the vital need of making industry the basic line of defense so that, if necessity arises, it can supply munitions quickly and abundantly." They have adopted as the slogan of the campaign "National defense and international peace."

A STATISTICIAN IN CHARGE

W. S. Gifford, chief statistician of the American Telephone & Telegraph Company, will, through the offer of his services by his company, have general direction of the inventory. With five directors in each State there will be, all told, including Alaska, 49 working boards comprising 245 engineers, who will also have the co-operation of the 30,000 engineers identified with the five organizations from which they are appointees.

In a word the movement for industrial preparedness comprises three distinct initial steps. The first is to find out what American industry can actually produce in munitions of war. The second is to apply that knowledge in a practical way, which will put the plants of this country into the service of the Government behind the army and navy. The third step is to form such an organization of skilled labor as will not get off the job, as Mr. Coffin puts it, when war comes; that will not allow skilled workers to go to the front only to be pulled back later, more or less demoralized, to tasks from which they never should have been taken.

Trade Commission Asked to Investigate Backward Deliveries of Steel

The St. Louis Iron Store Company, St. Louis, Mo., has requested Congressman William L. Igoe to cause an investigation of its charge that steel manufacturing companies are not pursuing an equitable method of filling orders placed with them for material. The allegation is made that orders are not being filled in regular progression and that deliveries are being made on a basis which shows favoritism to special concerns and to foreign customers. Congressman Igoe has notified the St. Louis complainant that he has placed the matter before the Federal Trade Commission as one predicated upon unfair trade practices for the commission's investigation. The officers of the complaining company are Henry Speck, president; Frank Zimmerman, vice-president, and Charles Osthoff, secretary-treasurer. It has been unable to obtain material ordered five months ago with various mills and makes its charges as a result of developments arising out of its efforts to get delivery.

The Milwaukee Bridge Company, 1400 Thirty-fourth Street, Milwaukee, Wis., is constructing four large dredge-hulls for delivery to Siam, Malay Free State and the African Gold Coast, and one for the Government levee building project at New Orleans, La. The machinery and auxiliary equipment are being furnished by the Bucyrus Company, South Milwaukee. The dredges cost between $35,000 and $45,000. The Milwaukee Bridge Company has been building barges for ten years and has shipped such products to all parts of the globe.

Magnetic Tests of Soundness of Rails

Mechanical Properties May Be Determined of Identical Material That Is Put into Service —Similar Testing of Other Forms of Steel

WASHINGTON, D. C., March 28, 1916.—The determination of the homogeneity and soundness of every steel rail as it leaves the mill by an inexpensive device that will in no way delay the process of manufacture is foreshadowed by the results of investigations made by the Bureau of Standards concerning the correlation of the magnetic and mechanical properties of steel. While the experimental work has been concentrated on steel rails, the application to nearly all forms of iron and steel of the principles now being developed opens up a limitless field for the employment of these methods throughout the industry.

The work done by the bureau in this connection is briefly described in a forthcoming paper by Dr. Charles W. Burrows, who has personally conducted these experiments. A condensed summary is also presented of the work of other experimenters in this field. Dr. Burrows' research shows that the interrelation of magnetic characteristics and the mechanical behavior of steel is so close that, when sufficient data have been accumulated to furnish reliable interpretation of the readings of the apparatus employed, the mechanical properties of a piece of steel may be absolutely determined for all practical purposes.

Among the mechanical properties that have been studied in connection with the magnetic characteristics of steel are hardness, toughness, elasticity, tensile strength and resistance to repeated stresses. Another important phase is the variation in magnetic behavior, as the test piece is subjected to the influence of stress. The correlation here is so close that the strains set up in a stressed bar are accompanied by simultaneous variations in the magnetic behavior which change in character as the magnitude of the stress with respect to the elastic limit changes.

DETECTION OF FLAWS IN RAILS

At the present time Dr. Burrows is carrying on an investigation of the magnetic inhomogeneities along the length of steel rails. The rail to be examined and a similar rail are placed side by side. The rail under test is surrounded by a narrow test coil which is in electrical connection with a galvanometer. Surrounding the rail for some distance on each side of the test coil are two magnetizing solenoids. Opposite these two solenoids and surrounding the auxiliary rail are two similar solenoids. The test coil and the solenoids are rigidly connected together and mounted on a carriage which is free to travel along the test rail and its companion rail. Underneath the carriage is an electric motor which drives the apparatus along the length of the rails.

Any change in the magnetic induction in the test rails manifests itself by a deflection of the galvanometer coil. The position of the galvanometer coil is recorded by means of a spot of light reflected upon a photographic film. In order to make a continuous record the film is driven at a uniform rate by an electric motor. To explore the length of a rail the current in the magnetizing solenoids is adjusted and the electric motors driving the carriage and the film started simultaneously. A great many modifications of the method of exploration have been made. Some of the records, for example, were taken with one test coil surrounding each rail and coupled so that the emfs. generated opposed each other.

To determine the importance of the magnetic irregularities observed several artificial defects were made in some ordinary 100-lb. rails all of which had been in service and had been submitted to the bureau because of suspected imperfections. In general they were from the same heat as other rails which have caused wrecks or otherwise failed in service. In order to simulate the effect of a transverse fissure a saw slot 1 mm. wide cutting away about 10 per cent of the section of the rail was made. This slot was filled in with high permeability transformer iron and the surface thus filled in was smoothed down with a file. The film record in this case showed the magnetic effect of the saw slot very clearly and in a later test of this same saw slot without the soft iron filling the galvanometer deflection was so violent that the spot of light went far beyond the bounds of the film. In either case the magnetic test developed the position of the slot within 1 cm. On another rail a similar slot was cut into the base and gave a record of similar characteristics. To determine whether this method would detect a flaw in the web of a rail, records of the magnetic condition were made with holes drilled in the web, the results appearing clearly in each case.

Early in the bureau's experiments it was noted that the film record showed a wavy form of remarkable uniformity. A comparison of the magnetic record with the tie marks on the rail developed the interesting fact that there was a cycle of magnetic variation which repeated itself at intervals equal to the spaces between the ties and it became apparent that the portion of the rail over the tie was magnetically harder than the intermediate portions. This fact is regarded as of much significance in respect to proper track construction because of the indisputable evidence that rail fissures occur more frequently over the ties than in the interspaces.

CORRESPONDENCE OF MECHANICAL AND MAGNETIC CHARACTERISTICS

The author's conclusions, based upon all the work done in this connection, but especially upon the experiments conducted in the bureau, may be summarized as follows:

The evidence points to the conclusion that there is one and only one set of mechanical characteristics corresponding to a given set of magnetic characteristics, and conversely there is one and only one set of magnetic characteristics corresponding to a given set of mechanical characteristics.

Magnetic observations taken during the course of a tensile test will indicate the time when the true elastic limit, the yield point, the necking down point and the ultimate strength are reached. In addition, the magnetic data will give some idea of the uniformity of the material.

If it is once determined what treatment is requisite for a given steel, a magnetic test may be used to determine whether or not the material has been brought into the desired condition.

It is quite possible that the magnetic data may be used to define a bar of steel. In no other manner than by a magnetic examination is it possible without doing violence to the specimens to determine whether two steel bars are identical in properties.

A magnetic test indicates the character of the entire cross-section of the metal, rather than merely a surface phenomenon, as in the case of certain hardness tests.

Notwithstanding the possibilities of the magnetic test it must be remembered that before magnetic characteristics can be relied upon in practice further investigation is necessary and a large number of accurate measurements on specimens of known mechanical composition and heat treatment must be made. Before a magnetic test can be of service as an indicator of the mechanical characteristics in any particular case preliminary work must be done to determine the most suitable magnetic data and also the minimum amount which will give the desired information. Among the

magnetic characteristics which may be used are permeability, residual induction, coercive force, hysteresis energy, etc., and each of these may be taken in connection with any one of a great number of magnetizing forces.

METHOD OF PROCEDURE

For a concrete case, suppose that the problem is to devise a magnetic test for a steel spring or a crank axle. The preliminary investigation would take some such course as the following:

1. Determination of magnetic normal induction curves and hysteresis data for test pieces made of the materials to be tested and submitted to the various heat and mechanical treatments that may be expected in practice.

2. Comparison of the above magnetic data with the corresponding mechanical data and the determination of the most suitable magnetic data to use.

3. Working out of the experimental details so that the required magnetic measurements may be made on the full size commercial specimen.

4. Checking out of magnetic and mechanical data on the full size specimens to be sure that the same conditions are fulfilled as in the case of the original test pieces.

Relatively long objects uniform in diameter, such as rails, steel rims, band screws, drills and steel cables present no difficulty. Relatively long objects whose cross-section changes gradually from section to section, such as spring leaves, straight axles and files present comparatively little difficulty. Relatively long objects of irregular section such as crank axles present great but not insuperable difficulty. Short, thick castings present difficulties which for the present seem insuperable.

Dr. Burrows suggests that it may prove practicable to install apparatus through which each rail may be quickly passed as it leaves the gagging press and its homogeneity and soundness determined from end to end. In view of the theory now coming to be accepted that transverse fissures, the cause of so many disastrous rail failures, may be ascribed to strains due to the gagging process, the testing of the rail at this point would seem to be highly appropriate. W. L. C.

Continued Large Buying of Locomotives

Orders and inquiries for locomotives continue in large volume. In the last two weeks about 200 have been ordered and inquiries for 200 have appeared. The Pennsylvania Lines West have ordered 25 Mikados from the Lima Locomotive Corporation; the Great Northern 25 Mikados from the Baldwin Locomotive Works and the St. Louis and San Francisco 30 Santa Fes from the same builder, which will also furnish the Chicago & Great Western with 10 switching engines. The American Locomotive Company will build 6 locomotives for the Russian Imperial Government, and 5 for the Chicago Junction. The Norfolk & Western has ordered 6 consolidation locomotives from the Baldwin Locomotive Works. The Westinghouse Electric & Mfg. Company will construct 50 electric locomotives for the New York, New Haven & Hartford.

The principal inquiries include 100 locomotives for the Southern Pacific and 25 each for the Philadelphia & Reading, the Lehigh Valley and the Southern Railroad. The Chicago, Burlington & Quincy has withdrawn its inquiry for 30 locomotives.

Up to and including the third week in March 1110 locomotives are estimated to have been ordered, of which 175 were foreign. Probably over 1200 have been ordered to date in 1916 or 400 per month, which compares with 1972 as the total for 1915, or only 164 per month.

The Buffalo Dredge & Dock Company has contracted for the 1200-ft. concrete ore dock to be built by the Donner Steel Company at Buffalo. It will require 1100 tons of reinforcing bars and 20,000 wooden piles. As already noted the McClintic-Marshall Company, Pittsburgh, has the contract for the 4000 tons of structural steel required for the new blast furnace and steel works buildings.

Nick and Break Test Discussed by Railroad Engineers

The American Railway Engineering Association, with an attendance that taxed the capacity of the meeting place, met last week in the Congress Hotel, Chicago. Of particular interest among the topics which the railroad engineers discussed from the standpoint of the rail mills, was the paper presented by Robert W. Hunt and C. W. Gennet, Jr., giving the results of the nick and break test included in the specification under which 35,000 tons of Illinois Central Railroad rails were rolled by the Algoma Steel Corporation. This paper was printed in last week's issue of THE IRON AGE.

Informal discussion of the paper, which was presented on Tuesday evening, brought out the fact that among 10,000 tons of rails rolled under this test for the Canadian Pacific and among 35,000 tons rolled for the Illinois Central, in a period of ten months' service, rail failures were very markedly fewer than was the case with the previous lot of rails in service during a similar period. It was the prevailing opinion that the ingot is the logical unit for inspection and that the nick and break test is admirably suited to the detection of defects due to piping. It was not felt that the inspection provided for under the nick and break tests was conclusive in determining defective rails due to segregation. The nick and break test constitutes a safe check on the amount of discard necessary from the ingot, but, as was suggested by W. C. Cushing, of the Pennsylvania Lines, the fact that so much of the ingot must be discarded, and that some defective rails come from the bottom of the ingot, points to the real problem of the rail maker as finding a solution not so much in the character of the test as in the betterment of the ingot.

In connection with the comparison of the nick and break test with the Pennsylvania chemical analysis requirements, it was pointed out that the chief object in the Pennsylvania specifications has to do with a determination of the chemical character of the particular rails, that in event of failure a closer check may be had than is available from the heat or ingot analysis. This specification appears to require a discard of from 30 to 35 per cent and it was stated that for the Pennsylvania Lines West of Pittsburgh the mills supplying rails no longer submit "A" rails for inspection. The opinion prevailed that the nick and break test is a forward step in bringing the unit of test within narrower limits, but is not of itself entirely sufficient to yield all the information desired concerning the rails laid in tracks.

Machine Tool Builders' Conference

The executive committee of the National Machine Tool Builders' Association has decided to give up the usual spring convention, with its regular program, and have in its place a conference of the members who may attend the National Metal Trades Association, in New York, April 27 and 28. The conference will be held on Saturday, April 29, at the Hotel Astor. There is no fixed program, but there will be a discussion of the problems arising out of the present machine-shop situation.

Embargo on Port Henry Ore

Since Saturday, March 11, the Delaware & Hudson Railroad has enforced an embargo on iron ore from the Port Henry, N. Y., district to all points on its line south of Schenectady. Hundreds of cars of ore are held up on various sidings, and there has been no little inconvenience to eastern Pennsylvania furnaces, though no actual banking has resulted as yet.

A workmen's compensation act has been passed by the Kentucky Legislature which is virtually compulsory, as it deprives employers who do not accept its terms of various common law defenses. Other legislation enacted at the session just ended requires corporations to pay their employees at least twice each month.

Government Armor Factory Hearing

WASHINGTON, D. C., March 28, 1916.—Following the passage by the Senate of the Tillman bill providing for the purchase or construction of a Government armor factory, the House Committee on Naval Affairs on March 22 and 23 granted a hearing on the measure to President E. G. Grace of the Bethlehem Steel Company and Vice-President W. P. Barba of the Midvale Steel Company.

President Grace expressed disappointment that neither the Senate Naval Committee nor the Senate in disposing of the Tillman bill had given any serious consideration to the proposition of his company to reduce the price of armor $30 a ton, notwithstanding the present and prospective high cost of all material entering into its manufacture. He, therefore, laid before the House committee a carefully prepared statement in part as follows:

We will manufacture one-third, or such additional quantity as may be awarded to us, of the armor plate required for the contemplated five-year naval program, estimated at approximately 120,000 tons, at a price of $395 per ton for side armor, as compared with the price of $425 now obtaining. The proposed price is lower than has been paid by the Government for more than ten years.

If the foregoing price is not satisfactory we will agree to permit any well known firm of chartered accountants, or the Federal Trade Commission, to inventory our plant and make careful estimates of the cost of manufacture; with that data in hand we will meet the Secretary of the Navy and agree to manufacture armor at a price which will be entirely satisfactory to him as being quite as low as the lowest price at which the Government could possibly manufacture armor on its own account, after taking into account all proper charges.

We make the foregoing proposition rather than have our plant put out of existence. We have invested, as actually inventoried to-day, over $7,000,000 in that plant. This figure does not take into account the large expenditures, certainly $2,000,000, for the plants and equipment which have been abandoned on account of becoming obsolete.

Mr. Grace was cross-examined at length by members of the House Committee. He expressed the opinion very positively that it would be impossible for the Government to construct an armor factory and, under the supervision of naval officers who have had no practical experience, turn out reliable armor within five years. Questioned as to the policy that would be pursued by his company in the event of the passage of the pending bill, he said that he would recommend to his board of directors that they take the necessary steps to go out of the armor business when the Government establishment is ready to deliver armor. He qualified this statement by adding that if the United States should become involved in war, or if a war cloud hovered over the country, the Bethlehem Steel Company would patriotically put its entire plant at the disposal of the Government and work it 24 hr. a day with all its best energies.

Mr. Barba also repeated to the committee the offer made to the Senate to reduce the price of armor, and as an alternative proposition declared his company would be satisfied to manufacture armor on a basis of actual cost of production plus 20 per cent. The profits made by contractors on Government work, he said, are greatly overestimated by the public; not only are contract prices on Government work very moderate, but the departments were constantly raising standards and providing more difficult specifications, some of which could not possibly be met. The Midvale Steel Company, he said, had already lost $300,000 on a contract to make armor-piercing shells for the navy as the result of the adoption of high standards in excess of anything attempted in this country or elsewhere.

It will probably be several weeks before the armor factory bill is voted on by the House committee.

W. L. C.

The Cleveland Electro Metals Company is now occupying its plant at West Fifty-eighth street and the Nickel Plate Railroad, Cleveland, Ohio. This includes a furnace building, 100 x 100 ft., and a two-story office, laboratory and storage building, 50 x 100 ft. The plant is equipped for manufacturing aluminum ingots from scrap and has a capacity of about 200,000 lb. per month.

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Iron and Steel Markets

PRICES NEAR THE CREST?

Sentiment Grows More Conservative

An Advance of $2 on Black Pipe and $4 on Galvanized—War Demand Less

Signs of a more conservative spirit are beginning to appear in the steel trade, with intimations that the crest of the wave of price advances has been reached or is near at hand. Sentiment inclines no less strongly to the belief that the mills will be crowded for all the year, but there is less excitement and buyers are not as indifferent to the effects of high prices.

War demand is not as insistent, partly because of the long time for which mills are sold. But there is the definite statement from agents of Great Britain that they will now place no contracts for machining shells for more than three months ahead. In several quarters in the machine tool trade the pressure is not so great.

Some manufacturing consumers of iron and steel, driven for months by the fear of a shortage of material, have large stocks and many inventories have doubled. At the same time premiums for early delivery in certain other lines, particularly for plates, shapes and bars, tend higher, indicating small stocks in manufacturing buyers' hands.

In March the railroads have put 900,000 tons or more on the books of the rail mills for 1917 rolling, and deliveries are largely in the second quarter. Spikes, bolts and other track supplies are being ordered for next year also. Car buying is moderate. Instead of the 15,000 to 20,000 cars for the Pennsylvania, widely heralded, that company is buying 25,000 tons of steel for the 2000 cars it will build for itself. Locomotive orders have been large, the total for the first quarter of the year being about 1200, against 2000 for all of 1915.

An interesting development is the taking before the Federal Trade Commission of a Western jobbing firm's complaint that some steel manufacturers are failing to deliver on its contract while selling for early delivery to others at high prices. The charge has been heard of before, but this is the first instance that the "unfair practice" statute has been invoked.

Prices of wrought pipe, both iron and steel, were advanced March 29 $2 a ton for black and $4 for galvanized. Sizes above 12 in. remain the same. Boiler tubes were advanced $2, likewise oil country goods and line pipe.

In the Chicago district, where capacity for 1916 is more fully sold than elsewhere, inquiry is coming in from manufacturing consumers for the first quarter and first half of 1917, stimulated apparently by the large railroad buying there.

Western implement makers are giving wide publicity to the probable curtailment of their output this year because of high prices and scarcity of soft steel bars. Some of this trade covered for bars at 1.90c. for the second half, and in other cases at 2c. and higher. As yet bar iron has not been called for in place of steel in this service to the extent expected.

Some Ohio sheet mills have had to curtail operations from inability to get sheet bars; but that fact has not prevented some irregularity in prices for black sheets. For blue annealed, prices still show an abnormal relation to those for black sheets. Automobile demand is insatiate, a late transaction being for 20,000 tons. There has been a large business in heavy, wide sheets.

Variations in prices for early delivery grow wider. Lots of 50 tons or more of plates have sold for delivery in a few weeks at 4½c., Pittsburgh. At Cleveland Eastern mills have sold plates at 3.75c. "Delivery at the convenience of the mill" is going into many contracts. Bars under this stipulation are commonly sold at 2.45c. to 2.50c., Pittsburgh. Round lots for delivery in the second quarter have brought 3c.

Scarcity of semi-finished steel is still marked, but it is now possible to place orders for deliveries that would not be entertained by any mill two months ago. Open-hearth billets have sold at $45, Pittsburgh.

Pig-iron buying for the first quarter and first half of 1917 is the significant feature in that market. There is not much of it yet, but it is noteworthy that current prices have been the basis of such transactions, a number being reported in the Cincinnati market.

In eastern Pennsylvania, New York and New England there has been some good buying of basic and foundry irons for this year's delivery—probably 25,000 tons of basic and as much of malleable and foundry grades. The recent low-priced sellers now ask more, but other sellers have not advanced their prices. Buffalo furnaces are now generally sold up into the fourth quarter.

Pittsburgh

PITTSBURGH, PA., March 28, 1916.

The opinion is growing stronger that probably the crest has been reached in prices, which have been regarded for some time as having attained dangerous levels. In the past three or four days new inquiry has not been so heavy, but this is probably because consumers are filled up, and are not inclined to place more contracts for material at present prices that they will not need for some months. The mills are showing no uneasiness at this change in sentiment among buyers, but on the contrary welcome it. The larger steel companies are practically sold out on nearly everything they make for the remainder of this year, and the pressure for delivery by customers is as strong now as at any time. The market is strong in every way, very high prices are being paid for material for third and fourth quarter delivery, but, with buyers feeling that there is no incentive to place orders ahead, the falling off in the amount of new business being placed will likely become more pronounced.

Pig Iron.—We can report sales of 30,000 to 40,000 tons of basic iron to a large consumer for delivery over three or four months at $18.25 at Valley furnace.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

	Mar. 29, 1916.	Mar. 22, 1916.	Feb. 23, 1916.	Mar. 31, 1915.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia	**$20.25**	$20.00	$20.00	$14.25
No. 2, Valley furnace	18.50	18.50	18.25	12.75
No. 2 Southern, Cin'ti	17.90	17.90	17.90	12.15
No. 2, Birmingham, Ala.	15.00	15.00	15.00	9.25
No. 2, furnace, Chicago*	19.00	19.00	18.50	13.00
Basic, del'd, eastern Pa.	**20.00**	19.50	19.50	13.50
Basic, Valley furnace	18.25	18.25	17.75	12.50
Bessemer, Pittsburgh	21.95	21.95	20.70	14.55
Malleable Bess., Ch'go*	19.50	19.50	19.00	13.00
Gray forge, Pittsburgh	18.45	18.45	18.45	13.45
L. S. charcoal, Chicago	19.75	19.75	19.75	15.75
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh	45.00	45.00	35.00	20.00
O.-h. billets, Pittsburgh	45.00	45.00	35.00	20.00
O.-h. sheet bars, P'gh	45.00	45.00	35.00	21.00
Forging billets, base, P'gh	65.00	65.00	55.00	25.00
O.-h. billets, Phila	50.00	50.00	42.00	21.52
Wire rods, Pittsburgh	57.00	57.00	50.00	25.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	2.559	2.559	2.409	1.15
Iron bars, Pittsburgh	2.40	2.40	2.25	1.10
Iron bars, Chicago	**2.35**	2.15	1.90	1.12½
Steel bars, Pittsburgh	2.75	2.75	2.50	1.15
Steel bars, New York	2.919	2.919	2.669	1.319
Tank plates, Pittsburgh	3.50	3.50	2.75	1.10
Tank plates, New York	3.669	3.669	3.169	1.269
Beams, etc., Pittsburgh	2.50	2.50	2.25	1.15
Beams, etc., New York	**2.669**	2.619	2.419	1.269
Skelp, grooved steel, P'gh	2.30	2.30	2.00	1.12½
Skelp, sheared steel, P'gh	2.40	2.40	2.10	1.17½
Steel hoops, Pittsburgh	3.00	3.00	2.50	1.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

	Mar. 29, 1916.	Mar. 22, 1916.	Feb. 23, 1916.	Mar. 31, 1915.
Sheets, Nails and Wire, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	2.75	2.75	2.60	1.80
Galv. sheets, No. 28, P'gh.	4.75	4.75	4.75	3.40
Wire nails, Pittsburgh	2.40	2.40	2.30	1.60
Cut nails, Pittsburgh	2.30	2.30	2.20	1.55
Fence wire, base, P'gh	2.25	2.25	2.15	1.40
Barb wire, galv., P'gh	3.25	3.25	3.15	2.10
Old Material, Per Gross Ton:				
Iron rails, Chicago	18.00	18.00	17.25	12.00
Iron rails, Philadelphia	20.00	20.00	19.50	13.00
Carwheels, Chicago	14.50	14.50	13.50	9.75
Carwheels, Philadelphia	**17.50**	16.50	16.50	11.00
Heavy steel scrap, P'gh	*18.50*	19.00	17.00	12.00
Heavy steel scrap, Phila	**17.50**	17.00	16.50	11.00
Heavy steel scrap, Ch'go	16.75	16.75	14.75	9.25
No. 1 cast, Pittsburgh	16.25	16.25	15.25	12.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	12.00
No. 1 cast, Ch'go (net ton)	13.50	13.50	12.75	9.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$3.25*	$3.50	$3.50	$1.50
Furnace coke, future	3.00	3.00	2.50	1.65
Foundry coke, prompt	3.75	3.75	3.50	2.00
Foundry coke, future	3.50	3.50	3.25	2.15
Metals, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	27.12½	27.12½	27.37½	17.00
Electrolytic copper, N. Y.	26.87½	26.87½	27.25	15.62½
Spelter, St. Louis	*17.50*	17.75	21.25	9.25
Spelter, New York	*17.75*	18.00	21.50	9.50
Lead, St. Louis	8.00	8.00	6.22½	4.12½
Lead, New York	8.00	8.00	6.30	4.15
Tin, New York	**50.00**	49.62½	42.20	52.00
Antimony, Asiatic, N. Y.	45.00	45.00	44.00	22.00
Tin plate, 100-lb. box, P'gh	$4.25	$4.25	$4.00	$3.35

Otherwise, the local pig-iron market is quiet. There is a scarcity in the supply of Bessemer iron. We note sales of 3000 tons of Bessemer at $21, Valley furnace, for April, May and June; 1000 tons of sand-cast Bessemer iron to a local foundry for delivery in last four months of this year at $21.50, the buyer paying a little above the market to get sand iron; 1500 tons of Bessemer, and another of 1000 tons at $21, Valley. There has been moderate buying of foundry iron for third and fourth quarter on the basis of $18.50 to $18.75, Valley furnace, for No. 2. The Union Switch & Signal Company has bought 3000 to 4000 tons of foundry and malleable Bessemer for delivery over second half. The Marshall Foundry Company of this city is inquiring for 20,000 tons of Bessemer for last half of the year delivery, but has not yet closed for any part of it. The expected shortage in supply of basic iron has not yet developed. We quote Bessemer iron at $21; basic, $18.25; gray forge, $17.50 to $17.75; No. 2 foundry, $18.50 to $18.75, and malleable Bessemer, $18.50 to $19, all at Valley furnace, the freight for delivery in the Pittsburgh and Cleveland districts being 95c. per ton.

Ferroalloys.—The situation as regards future supply of ferromanganese is still very serious. Some consumers believe that before long the supply will be larger, but the real trouble is expected to develop in May or June. Several boats have lately arrived in this country, but any spare ferromanganese they had was quickly snapped up. One prominent producer of ferromanganese was offered $350 per ton for 400 tons for last half of the year delivery, which offer it promptly turned down. It might be possible to pick up a carload or two of ferromanganese at $450 to $500 per ton, but the supply at even these abnormal prices is very light. Importers are still naming $175, seaboard, for English 80 per cent, but, as has been the case for a long time, will give no guarantee as to deliveries. The supply of ferrosilicon is also very light, and consumers are having trouble in getting this material as fast as they need it. Nominal prices on 50 per cent ferrosilicon are $85 up to 100 tons; over 100 tons and up to 600 tons, $84; and over 600 tons, $83, all per gross ton, f.o.b. Pittsburgh. Prices of Bessemer ferrosilicon for delivery over remainder of the year are as follows: 9 per cent, $30; 10 per cent, $31; 11 per cent, $32; 12 per cent, $33; 13 per cent, $34.50; 14 per cent, $36.50; 15 per cent, $38.50, and 16 per cent, $41. Seven per cent silvery for the same delivery is $26.50; 8 per cent, $27; 9 per cent, $27.50; 10 per cent, $28; 11 per cent, $29, and 12 per cent, $30. All these prices are f.o.b. at furnace, Jackson, Ohio; New Straitsville, Ohio, or Ashland, Ky., each of these points having a freight rate of $2 per gross ton to Pittsburgh.

Billets and Sheet Bars.—There is a feeling among makers and consumers of semi-finished steel that probably top prices have been reached. There is still a great scarcity, but at the same time it is possible now to buy steel from one or two sources that a month or two ago could not furnish it at any price. One interest reports a sale of about 1500 tons of open-hearth billets at about $45, Pittsburgh. It is said that consumers who have sliding scale contracts will pay $40, or more, for Bessemer and open-hearth billets and sheet bars for second quarter. We have not changed quotations, but it might be possible to buy billets or sheet bars at a shade less than they could have been obtained at a month ago. For delivery over the next month or two we quote: Bessemer billets, $45; open-hearth billets, $45; Bessemer sheet bars, $45, and open-hearth sheet bars, $45, maker's mill, Pittsburgh or Youngstown districts. We quote forging billets at $65 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 and up to 0.60 carbon take $1 extra.

Steel Rails.—It is estimated that 750,000 to 800,000 tons of steel rails has been placed with the mills for 1917 delivery. The Carnegie Steel Company has taken part of this large business, one of its orders being for 15,000 tons of rails for next year for the Erie Railroad. Engineers of the Pennsylvania Railroad are at work on its probable requirements for next year. The new demand for light rails is active, the Carnegie Steel Company having received new orders and specifications in the past week for close to 5000 tons. We quote light rails as follows: 25 to 45 lb. sections, 1.85c.; 16 and 20 lb., 1.90c.; 12 and 14 lb., 1.95c., and 8 and 10 lb., 2c., in carload lots. An advance of 5c. per 100 lb. is charged for less than carloads and down to 3 tons, while under 3 tons an additional 5c. is charged. We quote standard

section rails of Bessemer stock at 1.25c. and of open-hearth steel, 1.34c., Pittsburgh.

Structural Material.—Fabricating shops report they are having a great deal of trouble in getting material from mills, and are not able to get out their full product on this account. The Jones & Laughlin Steel Company has taken 600 tons for a Y. W. C. A. building at Baltimore, Md.; the American Bridge Company, 350 tons for Dulutt & Williams, New Orleans, for four steel barges for lower Mississippi River trade, about 250 tons for four maneuver boats for the Government, and 600 tons for a hotel at Fairmont, W. Va.; the McClintic-Marshall Company, 400 tons for an extension to the plant of the General Electric Company at Erie, Pa., and about 700 tons of bridge work for the Pennsylvania Lines West and 500 tons for a new building for the American Shipbuilding Company at Lorain, Ohio, and the Riter-Conley Mfg. Company, about 700 tons of bridge work for the Pennsylvania Lines West. Several contracts for shapes for delivery in third and fourth quarter have been taken by a local mill at 2.50c. at mill. We quote beams and channels up to 15 in. at 2.50c. to 2.75c. at mill, prices depending entirely on the delivery wanted.

Plates.—Reports that the Pennsylvania Railroad has an inquiry out for 15,000 to 20,000 cars are untrue. It is in the market for about 25,000 tons of plates, shapes and bars, also for wheels and axles for about 2000 cars that it will build in its own shops at Altoona, Pa. The Philadelphia & Reading has placed 500 steel hopper cars with the Pressed Steel Car Company and the same number with the Standard Steel Car Company. The New York Central has placed 1000 steel gondolas with the Standard Steel Car Company, and the Carnegie Steel Company is in the market for 60 gondolas, 10 steel hopper, 10 flat and 25 coal mine cars. The two local steel car companies report they are filled for the next three or four months on steel cars. The high prices being quoted by the car builders have resulted in some recent active inquiries being taken out of the market. Local plate mills are filled up for the remainder of the year and any mill that can make deliveries of plates within two to three months can get close to 3.50c. for them. We quote ¼-in. and heavier plates for shipment at convenience of the mill at 2.50c. to 2.60c., and for delivery in two or three months, 3c. to 3.50c. at mill. Smaller lots of boiler plates for prompt shipment have sold above 4c. per pound.

Sheets.—Output and shipments of sheets this month would no doubt have made a new high record were it not for the freight embargo into New England and the scarcity of cars. It is said sheets for New England delivery have been shipped into Canada and then to destination by a circuitous route, the buyer being willing to pay the excess freight charges to get the material. In some cases solid trains of sheets and tin plate have been made up and the roads have accepted these for New England shipment. Most mills have their blue annealed, electrical and stamping sheets practically sold out for this year, but can make deliveries on light black and galvanized sheets in three to four months from date of order. A leading sheet mill is reported to have sold about 20,000 tons of blue annealed sheets for extended delivery to a large Detroit automobile builder at 3c. per pound. We quote Nos. 9 and 10 blue annealed sheets, 2.90c.; No. 28 Bessemer black, 2.75c. to 2.85c.; open-hearth, 2.85c. to 2.95c.; No. 28 galvanized, Bessemer stock, 4.75c. to 4.85c., and open-hearth, 4.85c. to 5c., most of the mills holding for the higher figure. We quote Nos. 22 and 24 black plate, tin mill sizes, H. R. and A., 2.60c.; Nos. 25, 26 and 27, 2.65c.; No. 28, 2.75c.; No. 29, 2.85c., and No. 30, 2.90c. These prices are for carloads and larger lots, f.o.b. maker's mill.

Tin Plate.—The pressure on the mills for deliveries is very heavy and prompt shipment is very hard to obtain. Several makers have recently sold fair-sized lots from stock at $4.50 per base box, and it is also said that several fairly large orders for late in the year delivery have been placed at the same price. The mills are making new records for output as far as the supply of steel will allow and have specifications on their books to take their entire output pretty well up to October. Some in the trade believe that before long prompt tin plate will bring very close to $5 per base box. We quote 14 x 20 coke plates at $4.25 to $4.50 per base box, and 8-lb. coated ternes at $7.50 for 200-lb., and $7.80 for 214-lb., all f.o.b. maker's mill, Pittsburgh.

Rivets.—The new demand is heavy, but rivet makers are not getting out their full output on account of the bad deliveries of steel from the mills. Export demand is active, but, with the embargo on, export shipments cannot be made unless the shipper has a boat ready to take the material when it arrives in New York. We quote structural rivets, ½ in. and larger, at $3.25 per 100 lb. base, and conehead boiler rivets $3.35, f.o.b. Pittsburgh, terms 30 days net, or one-half of 1 per cent off for cash in 10 days.

Cold-Rolled Strip Steel.—New extras on cold-rolled strip steel have been adopted by all the makers. [These are given on another page in this issue.] The demand is heavy and makers report they have their output sold for the next five or six months, premiums over regular prices still being paid for fairly prompt delivery. We quote cold-rolled strip steel at $5.50 minimum, but this price has practically disappeared. On new orders makers are quoting from $5.75 to $6.25 base, f.o.b. mill, Pittsburgh.

Skelp.—The new demand continues heavy, and mills are sold up for four or five months ahead. We quote grooved steel skelp at 2.35c. to 2.40c.; sheared steel skelp, 2.45c. to 2.50c.; grooved iron skelp, 2.70c. to 2.80c., and sheared iron skelp, 3c. to 3.10c., all delivered to consumers' mills in the Pittsburgh district.

Railroad Spikes.—Specifications from railroads are only fairly active and new inquiry is quiet. Prices are strong. We quote:

Standard railroad spikes, 4½ x 9/16 in. and larger, $2.50; railroad spikes, ½ and 7/16 in., $2.60 base; railroad spikes, ⅜ in. and 5/16 in., $2.90 base; boat spikes, $2.65 base, all per 100 lb., f.o.b. Pittsburgh.

Nuts and Bolts.—Makers report the new demand still very heavy. They are unable to make their full output on account of scarcity of steel, deliveries from the mills being very unsatisfactory. Most makers of nuts and bolts are sold up over the next four or five months and are back in deliveries eight to ten weeks or longer. Discounts, which are stated to be for prompt acceptance only, are as follows, delivered in lots of 300 lb. or more where the actual freight rate does not exceed 20c. per 100 lb.:

Machine bolts, h. p. nuts, small, rolled thread, 60, 10 and 5 per cent; small, cut thread, 60 and 10; large, 50 and 10.

Machine bolts, c. p. c. and t. nuts, small, 60 per cent; large, 45.

Carriage bolts, small, rolled thread, 60 and 10 per cent; small, cut thread, 60 and 5; large, 50.

Blank bolts, 50 and 10 per cent. Bolt ends, h. p. nuts, 50 and 10; with c. p. nuts, 45. Rough stud bolts, 30. Lag screws (cone or gimlet point), 65. Forged set screws and tap bolts, 25 per cent.

Nuts, tapped or blank, h. p. square, $3.25 off; h. p. hex., $3.25 off; c. p. c. & t. sq. nuts, tapped or blank, $3.50 off; c. p. c. & t. hex., $3.50 off. Semi-finished hex. nuts, 70, 10 and 10 per cent; finished and case hardened nuts, 70 and 10.

Rivets, 7/16-in. diameter and smaller, 60.

Wire Rods.—No rods for the open market can be had from local mills, and it is said $60 has been offered for fair-sized lots of either Bessemer or open-hearth rods without getting them. We quote Bessemer, open-hearth and chain rods at $57 to $60, f.o.b., Pittsburgh.

Wire Products.—The very high prices ruling for barb wire will probably restrict the demand to some extent, particularly with the farmers, who will wait until prices are lower. However, the mills are sold up so far ahead they are not viewing this with much concern. Specifications against contracts for wire nails are active. While some nails have been sold at the $2.40 price, shipments going out are on contracts placed some time ago at prices ruling all the way from $1.90 up to $2.40 per keg. Some orders for fairly prompt shipment of wire nails have lately been placed at $2.50 per keg. An advance of at least $2 per ton in wire products is looked for at any time. Prices now quoted by the mills to domestic consumers for delivery at convenience of the mill are as follows: Wire nails, $2.40; galvanized, 1 in. and longer, taking an advance over this price of $2, and shorter than 1 in., $2.50; plain annealed wire, $2.25; galvanized barb wire and fence staples, $3.25; painted barb wire, $2.55; polished fence staples, $2.55;

cement coated nails, $2.40, base, all f.o.b., Pittsburgh, with freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven wire fencing are now 61½ per cent off list for carload lots; 60½ per cent for 1000-rod lots and 59½ per cent for small lots, f.o.b., Pittsburgh.

Shafting.—The shortage in supply of shafting is still very acute, and none of the mills can take new orders for delivery inside of four or five months. Specifications from the screw stock machine trade and the automobile builders are very heavy, while from the implement trade they are only fair, but are expected to be heavier in a short time. Prices are very strong and we quote cold-rolled shafting at 25 per cent off in carloads and 20 per cent in less than carloads, freight added to point of delivery.

Iron and Steel Bars.—One local mill has sold several large lots of steel bars for delivery in third and fourth quarters on the basis of 2.50c. at mill. This is the minimum price, some makers quoting 2.75c., and as high as 3c. for delivery in second and third quarters. It is said that inquiries are in this market now for upward of 150,000 tons of steel rounds to be furnished to the Allies in third and fourth quarters, but it is doubtful if much of this business will be taken by local mills as their obligations are such they are unable to make the deliveries wanted. We quote steel bars at 2.50c. to 2.75c. for delivery in third and fourth quarter, and 3c. at mill is said to have been paid for second quarter shipment.

Hoops and Bands.—The new demand is active and specifications against contracts are heavy. We quote steel hoops at 2.75c. and bands at 2.50c. for delivery at convenience of the mill, and for shipment in eight to ten weeks we quote steel hoops at 3c. and bands at 2.75c. at mill.

Merchant Steel.—Prices quoted are largely nominal as mills are sold up for three or four months ahead. Prices on small lots for shipment at convenience of the mill are about as follows: Iron finished tire, ½ x 1½ in. and larger, 2.35c., base; under ½ x 1½ in., 2.50c.; planished tire, 2.55c.; channel tire, ¾ to ⅞ and 1 in., 2.85c. to 2.95c.; 1 x ⅛ in. and larger, 3.25c.; toe calk, 2.95c. to 3.05c., base; flat sleigh shoe, 2.70c.; concave and convex, 2.75c.; cutter shoe, tapered or bent, 3.25c. to 3.35c.; spring steel, 2.95c. to 3.05c.; machinery steel, smooth finish, 2.75c.

Carwheels.—An inquiry is in the market from the Pennsylvania Railroad for 16,000 steel carwheels. It is doubtful whether deliveries could be made by local makers before late this year or early in 1917, as they are filled up for six to eight months and are very much back in deliveries to the steel car builders. We quote 33-in. freight carwheels in lots of 1000 or more at $18; 33-in. tender wheels, $22; 36-in. passenger or tender wheels, $26. These prices are based on a 10-in. diameter hub, 50c. extra being charged for 11-in., all f.o.b., Pittsburgh.

Wrought Pipe.—The new demand for both iron and steel pipe is stated by the mills to be the heaviest ever known in the history of the pipe trade. Several large makers say their orders booked so far this year are nearly three times in excess of the same period last year. Mills are sold up largely through second quarter and are not promising deliveries on new orders before third quarter. [Discounts on black pipe were shortened one point and galvanized two points, both iron and steel, March 29.]

Boiler Tubes.—Mills are sold up for four or five months and boiler shops and locomotive builders are specifying very heavily against contracts. On seamless steel tubing two leading makers state they are practically sold up for the remainder of this year. [Discounts on steel tubes were shortened one point, an advance of $2 per ton, March 29.]

Old Material.—Following the active buying of about two weeks ago, prices on nearly all grades of scrap have declined from 25c. to 50c. per ton and the local market is very dull. It is said consumers who bought heavily of heavy melting steel scrap recently did not in any case pay above $18.50, but some dealers sold short. In their desire to cover these short sales they ran prices up on themselves to $19 and even to $19.25. Consumers now seem well covered for the time being. Heavy steel scrap is not above $18.50, with reports that dealers have sold to each other at a lower price. The quotation on cast-iron borings in this report in the issue of THE IRON AGE of March 2, 1916, appeared as $10.25 per gross ton. This was a typographical error and the price should have been $11.25 per gross ton. A sale of two cars, or about 80 tons of cast-iron borings, was made on that date at $11.25 per gross ton delivered to consumer's mill. Prices on all grades of scrap are only fairly strong and are likely to go lower unless demand from consumers soon improves. Dealers now quote for delivery in the Pittsburgh and near-by districts that take the same rates of freight as follows per gross ton:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivered	$18.50
Hydraulic compressed bundled sheet scrap	16.50
No. 1 foundry cast	16.25
Bundled sheet scrap, side and ends, f.o.b. consumers' mills, Pittsburgh district	14.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	18.50
Bundled sheet stamping scrap	$13.00 to 13.25
No. 1 railroad malleable stock	16.00
Railroad grate bars	10.50
Low phosphorus melting stock	20.75
Iron car axles	25.50
Steel car axles	22.50
Locomotive axles, steel	25.00
No. 1 busheling scrap	15.25
Machine-shop turnings	11.00
Cast-iron borings	11.50
*Sheet bar crop ends	18.00
No. 1 railroad wrought scrap	19.00
Heavy steel axle turnings	13.50
Heavy breakable cast scrap	14.75

*Shipping point.

Coke.—Prices on standard grades of blast-furnace coke have gone off at least 50c. per ton, and it is now quoted at $3.25, with some sellers quoting as low as $3. The car situation is not satisfactory, and there has been a congestion in coke at several blast-furnace plants that has held up shipments, and the coke loaded for these furnaces is now being offered in the open market. While most producers of coke are quoting $3 for last half delivery, it is a question whether that price can be obtained. One Youngstown interest that has been a heavy buyer of coke in the open market will complete its by-product ovens in May or June, and this will displace 65,000 to 70,000 tons of coke per month that was formerly made in the Connellsville region. Other by-product coke plants now being built will be finished later in the summer, and there promises to be an oversupply of beehive coke during last half. We now quote standard makes of blast-furnace coke for prompt shipment at $3.25 and on contracts for the last half at $3 per net ton at oven. It is said that so far only one contract for remainder of the year delivery for furnace coke has been made at $3 per net ton, and this was paid by an Eastern blast furnace for a special low sulphur coke. The Connellsville *Courier* reports the output of coke for the week ended March 18 as 432,689 net tons, a decrease over the previous week of about 25,000 tons, largely due to several holidays in the coke regions.

Chicago

CHICAGO, ILL., March 29, 1916.—(*By Wire.*)

Inquiry for steel to be delivered in 1917 has been coming to the mills, both from railroads and manufacturing consumers, to an extent that leaves little doubt regarding the concern with which the latter view the situation. In many instances this inquiry leaves the question of price almost entirely to the discretion of the mill. There is no record of tonnage being booked, however, except where specific work is to be covered. In the case of wire nails, the buying of which is limited to 60-day periods, a perplexing problem is presented even where the material is required for specific work now being figured. The railroads are showing anxiety to cover for other materials than rails, while the inquiry from the manufacturing trade indicates a greater fear of materials famine than a break in the market. Except for the unparalleled demand for reinforcing steel, domestic inquiry for second quarter and last half shipment appears to have been largely discouraged, al-

though miscellaneous tonnages for prompt shipment, for which buyers expect to pay a premium, are being steadily received by the mills in position to handle this business. Inquiry from abroad, particularly from France and the Orient, indicating the effort of foreign manufacturers to buy direct, involves a large tonnage and wide range of products. Structural lettings last week included two contracts of 1000 tons, the railroads being prominently in the market. Buying of pig iron has tapered off noticeably, following three weeks of marked activity. But little of the strength which so markedly characterized the scrap market in the recent period of large buying remains, and the tendency is toward lower prices.

Pig Iron.—With considerable inquiry still to be closed and sales of the past several days running above 20,000 tons in the aggregate, the market continues to present a condition to be viewed with satisfaction by producers, even though buying has tapered off appreciably from the exceptional rate of the earlier weeks in March. Local iron is undisturbed as to price, $19 at the furnace for foundry and $19.50 for malleable being accepted as minimum quotations by the melters practically without question. A sale of basic by a merchant producer brought $19 as contrasted with recent steel company sales at $18. In quotations for Southern iron and for competitive Northern iron there is less uniformity, although the extreme variations due to the offering of resale Southern iron are in a measure disappearing. Heavy selling by some of the Southern producers, which has put them on a $16 basis at Birmingham, has had the effect of virtually withdrawing them from the market, since $15.50 is still available. One of the large Iroquois stacks is to be blown out shortly for relining, but less of a reduction in active capacity will result than had been anticipated, since the production of the smaller stack recently blown in has been increased to about 400 tons per day. Charcoal iron, which has been selling at a premium in the Chicago district, has found its largest market in more favorably located territory, and one interest reports larger sales in March than in any other month of the last nine years. For Lake Superior charcoal iron we quote delivery prices at Chicago to include a freight rate of $1.75. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$19.75
Lake Superior charcoal, No. 1	20.25
Lake Superior charcoal, No. 6 and Scotch	20.75
Northern coke foundry, No. 1	19.50
Northern coke foundry, No. 2	19.00
Northern coke foundry, No. 3	18.50
Southern coke, No. 1 f'dry and 1 soft	$19.50 to 20.00
Southern coke, No. 2 f'dry and 2 soft	19.00 to 19.50
Malleable Bessemer	19.50
Basic	19.00
Low phosphorus	34.00 to 36.00
Silvery, 8 per cent	29.50
Bessemer ferrosilicon, 10 per cent	33.50

(By Mail)

Rails and Track Supplies.—A few small contracts for rails for 1917 have been booked in addition to what was previously reported, and the bulk of Western rail tonnage for the first half of 1917 is probably on the books of the mills. In connection with rail purchases there has been a corresponding buying of spikes and bolts, for which the mills have received the prices quoted below. As compared with these quotations, spikes in small lots have sold as high as 3c. and bolts at 4c. An inquiry for a round tonnage of tie-plates for 1917 is noted. We quote standard railroad spikes at 2.60c., base; track bolts with square nuts, 3.25c. to 3.50c., base, all in carload lots, Chicago; tie-plates, $45, f.o.b. mill, net ton; standard section, Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.70c.; 16 to 20 lb., 1.75c.; 12 lb., 1.80c.; 8 lb., 1.85c.; angle bars, 1.50c. to 1.75c., Chicago.

Structural Material.—Among the contracts for fabricated material reported last week, the Omaha Railroad placed 960 tons with the Minneapolis Steel & Machinery Company for an office building at St. Paul; the Burlington, 875 tons of girder spans, about half of which went to the American Bridge Company; the Hercules Powder Company, San Diego, Cal., 1000 tons of shapes and plates with the Baker Iron Works and the Western Pipe & Steel Company; Frank Cuneo, 380 tons for a building at Chicago with the Morava Construction Company, and the Plant Milling Company, St. Louis, 330 tons with the American Bridge Company. The figuring on reinforced concrete for a large amount of building work which would ordinarily call for structural shapes is rapidly increasing. We quote for Chicago delivery of plain material from mill 2.539c.

We quote for Chicago delivery of structural steel from stock 3.10c.

Plates.—New inquiry for plates for delivery to Japan has appeared in this market and some business has been taken at fancy prices. In other instances, where quotations and deliveries quoted on export business have been acceptable, ocean freights have been found to be prohibitive. Estimates are being worked up on some business for 1917 building, for which there has been no public inquiry, but is is not yet certain that the cost can be kept within necessary limits. The Burlington is understood to have withdrawn all of its inquiry, except that for 500 automobile cars. The Frisco System has bought 30 locomotives and the Great Northern 25, from the Baldwin Locomotive Works. We quote for Chicago delivery of plates from mill for forward delivery 2.789c. and for fairly early shipment 3.439c.

We quote for plates for Chicago delivery out of stock 3.50c.

Sheets.—The market for sheets displays considerable irregularity, corresponding in a large measure to the material from which they are rolled and the quality of finish. Some buyers are accepting box annealed sheets rolled from Bessemer sheet bars at comparatively favorable prices, while for open-hearth and higher quality sheets, 3c., Pittsburgh, is a common price. The demand for blue annealed sheets continues heavy and 3c., Pittsburgh, for Nos. 9 and 10 is being regularly done. We quote for Chicago delivery, blue annealed, No. 16 and heavier, 3.089c. to 3.189c.; box annealed, No. 17 and lighter, 3.039c. to 3.189c.; No. 28 galvanized, 4.939c. to 5.189c.

We quote for Chicago delivery from jobbers' stock, minimum prices applying on bundles of 25 or more, as follows: No. 10 blue annealed, 3.25c.; No. 28 black, 3.10c. to 3.20c.; No. 28 galvanized, 5.40c. to 5.50c.

Bars.—Makers of high carbon bars confirm the reports of an exceptional demand for reinforcing purposes, and a minimum quotation of 2.50c. is now the rule, with sales reported at prices as high as 3c. Implement manufacturers have given considerable publicity to the probability of curtailment in their operations because of the scarcity of mild steel bars and the high level of prices. The substitution of iron bars for steel, which has not yet appeared in the degree long since anticipated, seems likely to materialize more extensively in the third quarter. We quote mill shipments, Chicago, as follows: Bar iron, minimum, 2.35c.; soft steel bars, 2.539c.; hard steel bars, 2.25c. to 2.50c.; shafting, in carloads, 30 per cent off; less than carloads, 25 per cent off.

We quote store prices for Chicago delivery: Soft steel bars, 3.10c.; bar iron, 3.10c.; reinforcing bars, 3.10c., base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 15 per cent off.

Wire Products.—The spring demand for wire, while less prominent in comparison with the large demands of some months past, is abnormally heavy. The trade apparently has not yet been able to build up its stocks to a point sufficient to cope with the demand, and the mills are directing special effort to accommodate their deliveries to the most imperative needs. Inquiry for nails for specific work in 1917 is appearing, but it is not yet clear in what manner this business will be taken care of. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $2.439; wire nails, $2.589; painted barb wire, $2.739; galvanized barb wire, $3.439; polished staples, $2.739; galvanized staples, $3.439, all Chicago.

Rivets and Bolts.—The demand for bolts apparently is occasioned by needs that cannot be balked by the high level of prices, and manufacturers continue to re-

port the business offered them as being in excess of anything they are able to deliver. Most of the buying is taking the form of small lots that can be worked in by the manufacturers to meet their customers' insistent needs. We quote as follows: Carriage bolts up to ⅝ x 6 in., rolled thread, 60-10; cut thread, 60-5; larger sizes, 50; machine bolts up to ⅝ x 4 in., rolled thread, with hot pressed square nuts, 60-10-5; cut thread, 60-10; larger sizes, 50-10; gimlet point coach screws, 65; hot pressed nuts, square, $3.25 off per 100 lb.; hexagon, $3.25 off. Structural rivets, ¾ to 1¼ in., 3.30c. to 3.40c., base, Chicago, in carload lots, boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 3.50c.; boiler rivets, 3.60c.; machine bolts up to ⅝ x 4 in., 65-5; larger sizes, 65; carriage bolts up to ⅝ x 6 in., 65; larger sizes, 50-15 off; hot pressed nuts, square, $3.70, and hexagon, $3.80 off per 100 lb.; lag screws, 65-10-5.

Cast-Iron Pipe.—James B. Clow & Son were the successful bidders for 900 tons at Kenosha, Wis., and formal award of 4300 tons, at Cleveland, was made to the leading interest. In the current week, 200 tons of cast-iron pipe for a sewer at Knox City, Ind., 450 tons of special pipe at Chicago, 1150 tons of high pressure pipe at Cincinnati and 1000 tons of high-pressure pipe at Toledo, Ohio, are to be awarded. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $32.50 to $33; 6 in. and larger, $29.50 to $30, with $1 extra for class A water pipe and gas pipe.

Old Material.—The market appears to have lost its headway and is drifting a bit, with scrap coming out too freely to afford anchorage. The weaker position is especially noticeable as affecting steel scrap. With both of the large consumers out of the market, having paid only $17 for heavy melting and $16.75 for shoveling steel, only $16.50 and $16.25 respectively are being offered for these grades by the dealers, who seem able to secure all and more than they have use for. Such short orders as there may have been, following recent buying, evidently were very promptly covered. There has been some buying of short rails at a wide range of prices, as low as $19 and as high as $20.50 being reported. Steel axle turnings are bringing from $14 to $14.50, Middletown. There is a comparatively limited demand for rolling-mill scrap, but one lot of No. 1 wrought brought $17.25 and another $17.50. No. 1 busheling has sold as high as $14.90, delivered, but immediate conditions hardly suggest as high a level. Foundry scrap is neglected and prices seem low as compared with current pig-iron quotations. The situation as a whole is another evidence that strength in the scrap market does not long survive the period during which consumers are actively buying regardless of other influences and conditions. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$18.00 to $18.50
Relaying rails	19.50 to 20.50
Old carwheels	14.50 to 15.00
Old steel rails, rerolling	18.00 to 18.25
Old steel rails, less than 3 ft.	19.00 to 19.50
Heavy melting steel scrap	16.75 to 17.25
Frogs, switches and guards, cut apart	16.75 to 17.25
Shoveling steel	16.50 to 17.00
Steel axle turnings	12.25 to 12.75

Per Net Ton

Iron angles and splice bars	$18.50 to $19.00
Iron arch bars and transoms	19.25 to 19.75
Steel angle bars	15.75 to 16.00
Iron car axles	24.00 to 24.50
Steel car axles	26.00 to 26.50
No. 1 railroad wrought	17.25 to 17.75
No. 2 railroad wrought	16.00 to 16.50
Cut forge	16.00 to 16.50
No. 1 busheling	14.50 to 15.00
No. 2 busheling	10.50 to 11.00
Pipes and flues	12.50 to 13.00
Steel knuckles and couplers	15.50 to 16.00
Steel springs	16.00 to 16.50
No. 1 boilers, cut to sheets and rings	12.25 to 12.50
Boiler punchings	14.00 to 14.50
Locomotive tires, smooth	18.25 to 18.75
Machine shop turnings	8.25 to 8.50
Cast borings	7.00 to 7.50
No. 1 cast scrap	13.50 to 14.00
Stove plate and light cast scrap	11.50 to 12.00
Grate bars	11.00 to 11.25
Brake shoes	11.25 to 11.50
Railroad malleable	14.25 to 14.50
Agricultural malleable	11.75 to 12.25

Philadelphia

PHILADELPHIA, PA., Mar. 28, 1916.

Eastern Pennsylvania structural mills find the pressure of demand heavier than ever, and their prices are stiffer. In most cases, they stipulate deliveries at their own convenience. With plates and bars the situation is but little changed as to prices, or otherwise. Getting plates is a problem which the railroads, among others, are finding troublesome. Some of the railroads are asking that their deliveries be increased. Forging billets show a stronger tendency. The placing of heavy tonnages of rails for 1917 delivery is impending. Foundry pig iron has moved well in the past few days, and there has been some activity in basic. Iron prices are stronger in all directions. There has been some further business in 80 per cent ferromanganese for 1917 delivery, and preparations are under way for its manufacture in a furnace at Lebanon. Old material has gained strength and the quotations for several grades have advanced, heavy melting steel having been purchased at $18.

Pig Iron.—The demand has been considerably more active, and a large aggregate tonnage of foundry iron has been placed, mostly for the last half. Sellers would be pleased to see more interest in nearby deliveries, but because of the freight embargoes and the heavy buying of a few months ago consumers have no need to buy for the near future, and this despite the fact that more iron is being melted. A fair quantity of Virginia iron has moved in the week, and a leading maker is sold up for the first half, according to his announcement. The minimum price of this producer for No. 2X is $21.25, Philadelphia. The minimum for eastern Pennsylvania No. 2X is about $20.25, Philadelphia, and some shopping would be necessary to get this price, as most of the makers quote higher. One quotes $20, furnace, or $20.79, Philadelphia. The Pennsylvania Railroad is in the market for 3100 tons of foundry iron. In basic some business is reported, but the sales were negotiated outside of this district and not all the details are available. The market is stronger, at about $20.50 to $21, Philadelphia. The price paid by a northern New Jersey steel works for about 4000 tons earlier in the month is understood to have been $18.50, Buffalo, or $20.60, delivered. This same interest is reported to have closed for 2000 additional tons. Some sellers of basic are asking up to $21.50, Philadelphia. A northern Pennsylvania consumer has taken over 10,000 tons in the past few days, and is negotiating for more. A leading firm making standard low phosphorus has booked about as much business as it cares for at present, as it is keeping in mind the future needs of its regular customers. The quotation is unchanged at about $32, Philadelphia. About 2000 tons of Lebanon low phosphorus has been taken for last half delivery at $30 to $32, furnace. Quotations for standard brands, delivered in buyers' yards, prompt shipment, range about as follows:

Eastern Pa., No. 2 X foundry	$20.25 to $20.75
Eastern Pa., No. 2 plain	20.00 to 20.50
Virginia, No. 2 X foundry	20.75
Virginia, No. 2 plain	20.25
Gray forge	19.00 to 19.50
Basic	20.00 to 20.50
Standard low phosphorus	32.00

Iron Ore.—Arrivals of foreign ore at this port in the week ended March 25 consisted of 12,112 tons from Sweden and 13,450 from Cuba.

Billets.—Open-hearth rerolling billets are quoted at $50 to $55, and forging steel at $65 to $75, according to specifications. With the latter the drift of prices is upward, and, high as prices are, they are paid with very little complaint. Specifications vary greatly.

Ferroalloys.—In a general way the situation is unchanged. Several thousand tons additional have been sold for delivery in the first half of 1917, and some of the agents of English makers have sold all they have been authorized to sell. The price for future delivery is unchanged at $175, seaboard. Spot is around $400 per ton. A maker of ferromanganese running 50 to 60 per cent asks $5 per unit. E. J. Lavino & Co., mentioned a week ago in connection with the production of

80 per cent ferromanganese at the furnace of the Berkshire Iron Works, Sheridan, Pa., are interested also in the making of a similar product in the old Meily furnace, Lebanon, Pa. In the week, 500 tons of English ferromanganese arrived here.

Plates.—The situation is in no way relieved, and where mills will accept business prices range from 3.659c., Philadelphia, upward. A leading mill quotes 3.909c., Philadelphia, as its minimum, and is frequently getting 4.159c., Philadelphia. This mill is not making any contracts where they can be avoided, and is considering only specific tonnages on which it can make delivery at a fixed time. Where ordinary contracts must be entered, delivery is to be made at the convenience of the mill. All of the railroads appear to be in need of material, and some of them are asking that their shipments be increased. At 3.50c., Pittsburgh, or 3.659c., Philadelphia, one company has made a few contracts for the third quarter, but is getting 3.909c., Philadelphia, where definite delivery is promised.

Bars.—The nominal quotation for steel bars is unchanged at 2.35c., Pittsburgh, or 2.509c., Philadelphia, but more is being paid whenever deliveries can be made out of stock. Iron bars are unchanged at 2.559c., Philadelphia, and the mills are filling up at this quotation.

Structural Material.—The demand for shapes is more overwhelming than ever, and eastern Pennsylvania mills are not quoting under 3c., Pittsburgh, or 3.159c., Philadelphia, with deliveries at the convenience of the mills. It is reported that the Sun Company requires 1500 tons for a shipyard at Chester, Pa. An addition to the building of Strawbridge & Clothier, this city, will require 400 tons. Many small propositions are under consideration.

Rails.—Among the Eastern railroads which are contemplating rail orders for 1917, and in a few cases for the latter part of this year, are the following: Baltimore & Ohio, Seaboard Air Line, New York Central, Erie, Delaware, Lackawanna & Western, Norfolk & Western, Atlantic Coast Line, Chesapeake & Ohio, Boston & Maine. The Pennsylvania has also showed some interest in its 1917 requirements.

Sheets.—Consumers are willingly paying 3.75c., Pittsburgh, or 3.909c., Philadelphia, for No. 10 blue annealed sheets, third quarter delivery.

Coke.—A considerable amount of coke business is pending. Prompt furnace is quoted at about $3.50 to $3.75 per net ton at oven and last half at about $3. Prompt foundry ranges from about $4 to $4.25 per net ton at oven, and contract at $3.50 to $3.75. Freight rates from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85, and Mountain, $1.65.

Old Material.—The market has been fairly active. Prices are higher, though they have been influenced as much by the activity in other sections as by the extent of business here. The freight embargoes continue to hamper shipments, particularly those of rolling-mill stock. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania, and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$17.50 to $18.00
Old steel rails, rerolling	19.00 to 20.00
Low phos. heavy melting steel scrap	22.50 to 23.25
Old steel axles	25.00 to 26.00
Old iron axles	27.00 to 28.00
Old iron rails	20.00 to 20.50
Old carwheels	17.50 to 18.00
No. 1 railroad wrought	23.00 to 23.50
Wrought-iron pipe	15.25 to 15.75
No. 1 forge fire	15.50 to 16.00
Bundled sheets	15.00 to 15.50
No. 2 busheling	11.00 to 11.50
Machine shop turnings	11.00 to 11.50
Cast borings	11.00 to 11.50
No. 1 cast	17.00 to 18.00
Grate bars, railroad	14.00 to 14.50
Stove plate	14.00 to 14.50
Railroad malleable	15.00 to 15.50

The Board of Trade of Louisville, Ky., will organize an Industrial Bureau in connection with the proposed fund of $1,000,000 to be used in establishing new enterprises in the city. The Louisville Gas & Electric Company has subscribed $25,000 to the fund.

Cincinnati

CINCINNATI, OHIO, March 29, 1916.—(*By Wire.*)

Pig Iron.—Quite a number of foundry iron melters quietly bought in the past few days to cover first quarter and first half requirements for next year. Few general inquiries were put out, and practically all transactions were personal ones between the buyer and seller and little correspondence passed between them. Probably more Northern foundry iron has been sold for next year's delivery than Southern. Among Northern iron sales that may be noted for first quarter and first half shipment is one for 2000 tons to a nearby melter. A central Ohio consumer contracted for 700 tons and two Indiana melters bought respectively 500 and 1000 tons. Several 500-ton lots of Southern iron were also bought in this territory for shipment in the last quarter of this year and the first quarter of next, and 1000 tons of Northern foundry was also taken for the same delivery. A Michigan firm bought 500 tons of malleable for first quarter shipment and 500 tons of Lake Superior charcoal iron was bought by another firm in the same vicinity. Only a few open inquiries are out, chief among which is one from central Ohio for 700 tons of foundry iron and a southern Ohio firm is expected to close this week for 400 tons of Southern foundry. Southern iron is unchanged at $15, Birmingham basis, for first half shipment, although only a few furnaces are naming this figure. The last quarter price is now generally stated to be $15.50, and for the first quarter and first half of next year $16 is named. The furnace price of Northern foundry, malleable and basic is $19, Ironton, for this year's shipment, and there is very little resale iron obtainable below this figure. The first half quotation on Northern iron is $20, Ironton, but it is understood contracts have been made at a lower figure. The silvery irons are not very active and the furnace price of $27 seems rather difficult to maintain. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$18.40 to $18.90
Southern coke, No. 2 f'dry and 2 soft	17.90 to 18.40
Southern coke, No. 3 foundry	17.40 to 17.90
Southern No. 4 foundry	16.90 to 17.40
Southern gray forge	16.40 to 16.90
Ohio silvery, 8 per cent silicon	28.26 to 28.76
Southern Ohio coke, No. 1	21.26
Southern Ohio coke, No. 2	20.26
Southern Ohio coke, No. 3	19.76
Southern Ohio malleable Bessemer	20.26
Basic, Northern	20.26
Lake Superior charcoal	21.20 to 22.20
Standard Southern carwheel	25.40 to 25.90

(*By Mail*)

Coke.—A considerable quantity of foundry coke is still being contracted for. Some purchases have been made for shipment the remainder of the year, but the majority of contracts run to July 1, 1917. Prices are unchanged, and we quote Connellsville 72-hr. coke at $3.50 to $3.75 per net ton at oven with Wise County and Pocahontas brands at the same figures, but probably a little more firmly held by the producers. New River foundry coke ranges from $4 to $4.75 per net ton at oven. Connellsville 48-hr. furnace coke is held at $2.50 to $3 at oven. No definite figures can be named on spot shipment of either furnace or foundry coke.

Finished Material.—Reinforcing concrete rods are in good demand and there is also a very good inquiry for structural shapes. While no material advances have been made on warehouse prices, all quotations are now more firmly adhered to than heretofore. We quote as follows: Steel bars, 3.20c., base; twisted steel bars, 3.25c.; plates, 3.50c.; small structural shapes, 3.20c.; No. 10 blue annealed sheets, 3.25c.; rounds and squares, 2 in. and over, 3.75c.; flats and bars, 1 in. and thicker, 3.75c.; cold-rolled rounds, 5 per cent over list; flats, squares and hexagons, 7 per cent over list. Jobbers' quotations on No. 28 galvanized sheets are around 5.20c. to 5.25c. Mill quotations on No. 28 galvanized sheets are 5.15c. to 5.20c., Cincinnati or Newport, Ky., and on No. 28 black 3.15c. to 3.25c. Local jobbers' quotation on wire nails to-day is $2.65 per keg base and on barb wire $3.50 per 100 pounds.

Old Material.—Several grades of scrap have been ad-

vanced in the past few days while others remain stationary. Bundled sheet scrap, old iron rails, locomotive tires and iron axles are evidently in better demand than some other grades. It is stated that the inability of consumers to get new steel billets promptly is a factor in causing the advance on locomotive tires. The minimum prices given below represent what dealers are willing to pay for delivery in their goods, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. at yards:

Per Gross Ton

Bundled sheet scrap	$12.00 to $12.50
Old iron rails	16.25 to 16.75
Relaying rails, 50 lb. and up	22.00 to 22.50
Rerolling steel rails	15.50 to 16.00
Heavy melting steel scrap	15.25 to 15.75
Steel rails for melting	14.50 to 15.00

Per Net Ton

No. 1 railroad wrought	$14.00 to $14.50
Cast borings	7.00 to 7.50
Steel turnings	7.00 to 7.50
Railroad cast scrap	12.25 to 12.75
No. 1 machinery scrap	14.00 to 14.50
Burnt scrap	9.00 to 9.50
Iron axles	20.00 to 20.50
Locomotive tires (smooth inside)	16.50 to 17.00
Pipes and flues	10.50 to 11.00
Malleable and steel scrap	11.00 to 11.50
Railroad tank and sheet scrap	9.00 to 9.50

St. Louis

ST. LOUIS, MO., March 27, 1916.

Pig Iron.—Demand has centered on special analysis iron and a considerable number of lots of 200 and 300 tons have been taken for second quarter and last half delivery. Sales of 4000 to 5000 tons have been made of all classes.

Old Material.—The scrap market has been a little softer in tone, but with no recessions in quotations. The larger mills are bidding for railroad material direct and taking on considerable quantities. The foundry grades are more active and stronger, and dealers are reporting good business. All lists previously reported closed at good figures. Relaying rails continue active. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton

Old iron rails	$17.00 to $17.50
Old steel rails, rerolling	17.00 to 17.50
Old steel rails, less than 3 ft	17.00 to 17.50
Relaying rails, standard section, subject to inspection	22.00 to 23.00
Old carwheels	13.75 to 14.25
No. 1 railroad heavy melting steel scrap	16.00 to 16.50
Heavy shoveling steel	14.50 to 15.00
Frogs, switches and guards cut apart	16.00 to 16.50
Bundled sheet scrap	11.00 to 11.50

Per Net Ton

Iron angle bars	$16.50 to $17.00
Steel angle bars	14.50 to 15.00
Iron car axles	23.00 to 23.25
Steel car axles	24.00 to 24.50
Wrought arch bars and transoms	19.00 to 19.50
No. 1 railroad wrought	16.25 to 16.50
No. 2 railroad wrought	16.00 to 16.25
Railroad springs	16.00 to 16.50
Steel couplers and knuckles	15.50 to 16.00
Locomotive tires, 42 in. and over, smooth inside	17.50 to 18.00
No. 1 dealers' forge	13.00 to 13.50
Mixed borings	9.00 to 9.50
No. 1 busheling	13.50 to 14.00
No. 1 boilers, cut to sheets and rings	11.50 to 12.00
No. 1 railroad cast scrap	13.00 to 13.50
Stove plate and light cast scrap	10.00 to 10.50
Railroad malleable	12.00 to 12.50
Agricultural malleable	11.00 to 11.50
Pipes and flues	11.00 to 11.50
Railroad sheet and tank scrap	11.00 to 11.50
Railroad grate bars	10.00 to 10.50
Machine shop turnings	10.50 to 11.00

Finished Iron and Steel.—No general business is being taken on future orders, as there is no willingness to specify date of delivery. One sale of 6000 tons of standard section rails for 1916 delivery was made to the Kansas City Southern. The Missouri, Kansas & Texas closed for 17,500 tons for 1917 delivery and is negotiating for 15,000 tons more. Other buying is expected shortly. One lumber interest has contracted for 500 tons of standard section rails. Movement out of warehouse continues up to capacity to handle stock. We quote for stock out of warehouse as follows: Soft steel bars, 3.15c.; iron bars, 3.10c.; structural material, 3.15c.; tank plate, 3.55c.; No. 10 blue annealed sheets, 3.30c.; No. 28 black sheets, cold rolled, one pass, 3.20c.; No. 28 galvanized sheets, black sheet gage, 5.60c.

Coke.—Difficulties of delivery continue and sales of small lots continue to be reported at $5 per net ton, Connellsville ovens, for prompt delivery. On by-product coke parallel quotations are being made, chiefly because no immediate or early deliveries are available. Later on the furnace being built here is expected to use up a considerable part of the available local supply.

Cleveland

CLEVELAND, OHIO, March 28, 1916.

Iron Ore.—Additional sales of Lake Superior ore amounting to about 170,000 tons, including one 100,000-ton lot, are reported during the last few days. Stocks on some of the furnace yards are running quite low and shippers have received many applications for early cargoes. With the severe weather lasting until nearly the end of March the ice at the upper Lake ports is still solid and there is now little indication of the opening of navigation before the latter part of April. The production of the underground mines is being pushed to the maximum and Lake shipments are expected to be very heavy from the start. While there is a scarcity of Lake boats for ore and some business is being offered at a price over the regular carrying charges, some shippers express the opinion that there is more cause to worry about a car shortage during the coming season than a lack of sufficient boats to bring down all the ore. A shortage of cars would not seriously affect the situation as long as there is plenty of dock space, but there is a possibility of the ore docks being filled to capacity during the latter part of the season should the car shortage become very acute, and in that case the Lake shipments might have to be curtailed. The Pittsburgh Steamship Company and the Interlake Steamship Company have advanced the wages of engineers on Lake boats about 10 per cent and an advance of 10 per cent over the minimum wages of last year has been adopted by the Lake Carriers' Association. We quote prices as follows, delivered lower Lake ports: Old range Bessemer, $4.45; Mesaba Bessemer, $4.20; Old range non-Bessemer, $3.70; Mesaba non-Bessemer, $3.55.

Pig Iron.—The market is rather quiet following the recent heavy buying movement, but buying has not entirely subsided. One Cleveland interest has advanced its price to $19 at furnace for No. 2 foundry, basic and malleable iron for out of town shipment and to $19.50 delivered to local consumers, and has taken on some foundry iron business for last half for outside shipment at the advance in price. The Valley price on foundry iron is apparently well established at $18.75 for No. 2, but some producers are holding for $19. Foundry iron is quoted at $20 in Toledo and Detroit. Some inquiries for both Northern and Southern foundry iron for delivery during the first half of next year have developed but furnaces generally are refusing to quote for that delivery although a small tonnage has been sold for the first quarter at no advance in price over the last half. Two or three small lot sales of Bessemer iron are reported at $21.50, Valley furnace. Southern iron is unchanged at $15.50, Birmingham, for No. 2 for prompt shipment and second quarter, and $15.50 to $16 for last half. Virginia iron is being offered for the first quarter of 1917 at $19, or the same price as is quoted for the fourth quarter. We quote, delivered Cleveland, as follows:

Bessemer	$21.95 to $22.45
Basic	19.00 to 19.50
Northern No. 2 foundry	19.00 to 19.50
Southern No. 2 foundry	19.50 to 20.00
Gray forge	18.45
Jackson Co. silvery 8 per cent silicon	28.62
Standard low phos., Valley furnace	$2.00

Coke.—Considerable activity in foundry coke has developed. Many consumers have closed contracts for a full year and some for the last half, a few consumers being unwilling to contract at present prices for the full year. We quote standard Connellsville foundry coke at $3.50 per net ton at oven for contracts for one year beginning July 1, $3.50 to $3.75 for the last half and $3.75 to $4 for prompt shipment. Standard foundry coke is quoted at $3.50 for prompt shipment.

Finished Iron and Steel.—The demand for steel for early shipment continues heavy, being supplied largely from warehouse stocks. Some manufacturers are being hampered by their inability to secure steel and have been forced to curtail work in their plants. Steel bars are quoted at 2.45c. to 2.50c., Pittsburgh, for delivery at the convenience of the mills, and some round-lot business has been placed at the latter price. Local plate prices are higher, Cleveland mills now quoting as high as 4c., Pittsburgh. Eastern mills quote plates at 3.75c. and structural material at 3c., at mill, for delivery in this territory. Hard steel bars are higher, now being quoted at 2.50c. to 2.75c., Pittsburgh, and iron bars at 2.50c. In the structural lines 4000 tons of steel has been placed for the Boody House, Toledo, Ohio, the fabricating contract not yet having been closed. New inquiries include 1000 tons of structural material for a freight warehouse for the Terminal Realty Company, Cleveland; 1000 tons for a building for the Marion National Bank, Marion, and 400 tons for a building for the Lorain County Savings & Trust Company, Elyria. The Ann Arbor Railroad is in the market for 1500 tons of rails for 1917 delivery. The demand for heavy and wide sheets is very active, being far in excess of that for light gages. Some of the Ohio mills have had their output curtailed because of the delay in securing sheet bars. We quote black sheets at 2.90c. to 3c., Ohio mill, for No. 28; blue annealed at 3c. to 3.10c. and galvanized at 4.75c. to 5.15c. Forging billets are in good demand, sales being made at $65, Pittsburgh. Warehouse prices are unchanged at 3.25c. for steel bars and structural material, 3.65c. for plates, 3.50c. for blue annealed sheets and 3.20c. for iron bars.

Bolts, Nuts and Rivets.—Agricultural implement manufacturers have inquiries out for bolt and nut contracts for the last half, but makers generally are declining to quote prices for that delivery owing to the uncertainty regarding the price of their raw stock of steel bars and wire. Fuel oil is also a factor in the situation, this having doubled in price and consumers being unable to cover for future requirements. Specifications and current orders continue heavy. Rivet consumers are placing contracts for the second and third quarters at the recent advance in prices. We quote rivets at 3.25c., Pittsburgh, for structural and 3.35c. for boiler rivets. Bolt and nut discounts are as follows:

Common carriage bolts, ¾ x 6 in., smaller or shorter, rolled thread, 60 and 10; cut thread, 60 and 5; larger or longer, 50; machine bolts with h. p. nuts, ⅜ x 4 in., smaller and shorter, rolled thread, 60, 10 and 5; cut thread, 60 and 10; larger and longer, 50 and 10; lag bolts, gimlet or cone point, 65; square h. p. nuts, blank or tapped, $3.25 off the list; hexagon, h. p. nuts, blank or tapped, $3.25 off; c. p. c. and t. square nuts, blank or tapped, $3 off; hexagon nuts, all sizes, $3.50 off; cold pressed semi-finished hexagon nuts, all sizes, 70, 10 and 10 off.

Old Material.—Increased activity has developed in the market during the past few days, but there has been a weakening in prices in spots and much of the business has been placed at some concession from the recent quotations. It is claimed, however, that all material offered at reduced prices was quickly absorbed. Heavy melting steel has declined 50c. to $17.50, at which price some local business was placed. One Cleveland mill that has not been in the market for some time bought a fair tonnage. Some steel axles were sold at $26, Ohio shipping point, for export. Sales of borings are reported at $8.50 and $8.75. We quote f.o.b. Cleveland as follows:

Per Gross Ton

Old steel rails	$17.50 to $18.00
Old iron rails	19.00
Steel car axles	26.00
Heavy melting steel	17.25 to 17.50
Old carwheels	14.50 to 15.00
Relaying rails, 50 lb. and over	22.50
Agricultural malleable	14.25 to 14.75
Railroad malleable	17.00 to 17.50
Steel axle turnings	13.25 to 13.50
Light bundled sheet scrap	14.00 to 14.25

Per Net Ton

Iron car axles	$23.00 to $24.00
Cast borings	8.50 to 8.75
Iron and steel turnings and drillings	8.00 to 8.25
No. 1 busheling	14.50 to 14.75
No. 1 railroad wrought	18.50 to 19.00
No. 1 cast	14.25 to 14.75
Railroad grate bars	11.75 to 12.00
Stove plate	11.75 to 12.00

Birmingham

BIRMINGHAM, ALA., March 27, 1916.

Pig Iron.—The tendency to advance to $16 for the second half is somewhat more manifest, but it is by no means unanimous. The leading interest continues to quote $15.50 for second half and, even though it has sold a considerable tonnage, it still has iron to offer at that price. The Woodward Iron Company is practically out of the market, taking on very little tonnage. Proffers of additional basic business have been declined. A firm offer of 20,000 tons of basic was turned down with the exception of 2000 tons, the interest booking it not caring to take on more basic under present conditions. The Alabama Company will not sell any more at this time except under extreme pressure. The Republic and Sloss-Sheffield have marked their prices up to $16 for second half and sales have been made, one lot of 1000 tons having been booked Friday at $16. Spot is available at $15 to $15.50. Sales have not been so large the past week, but the volume for the month to that time is much over 200,000 tons and the total for the month will be over capacity, which is about 230,000 tons. Machine shops and pipe works in this district are calling for more iron than in several years. The car shortage is becoming acute and there is apprehension that it will affect steel and iron as well as coal and coke movements. The first unit of the electric steel plant of the Anniston Ordnance Company, Anniston, Ala., is in operation, the second will start within a month and the third within six weeks. Shrapnel rounds are still being manufactured at Ensley and the rail mill is well supplied with orders. Payrolls of the leading interest have attained new high levels. We quote, per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft	$15.50 to $16.00
No. 2 foundry and soft	15.00 to 15.50
No. 3 foundry	14.50 to 15.00
No. 4 foundry	14.25 to 14.75
Gray forge	14.00 to 14.50
Basic	15.00 to 15.50
Charcoal	23.00 to 23.50

Coal and Coke.—No foundry coke of consequence is to be had under $4 per net ton at oven, which seems to be the one price. Coke producers find great difficulty in making prompt shipment, owing to the car famine. One asked for 60 cars and in four days secured six. A little more of this and some ovens must go cold; otherwise, the coke market is in splendid condition. Furnace coke is selling at $3 to $3.40, f.o.b. oven. Coal is not yet what it ought to be, but the prospect of the ocean-going business is good. Independent coal operators pin their faith in the future on the renewal of contracts this summer, when it is expected that the furnace interests will not be formidable competitors, owing to their own needs.

Cast-Iron Pipe.—The United States Cast Iron Pipe & Foundry Company has resumed at an idle pit in its Bessemer plant recently repaired, and work is rapidly approaching its conclusion on two new pits. A good sprinkling of orders came in during the week, the South showing up better than in some time. Business is much better than it was a year ago and prices still tend upward. Sanitary shops are in receipt of orders for spring stocks that are encouraging. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., $28; 6-in. and upward, $25, with $1 added for gas pipe and 16-ft. lengths.

Old Material.—Good machinery scrap is changing hands rapidly. Dealers are much more satisfied with conditions than for some time, owing to the disappearance of low-priced pig iron. Business is expected to pick up steadily. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	$13.00 to $13.50
Old steel axles	13.00 to 13.50
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	9.00 to 9.50
No. 1 country wrought	9.00 to 9.50
No. 1 machinery cast	10.00 to 10.50
No. 1 steel scrap	10.00 to 10.25
Tram carwheels	10.00 to 10.25
Stove plate	8.50 to 9.00

The Beall Bros. Mfg. Company, Alton, Ill., has installed machinery for the manufacture of 8-in. high-explosive shells to be utilized in filling war munitions contracts on hand.

New York

NEW YORK, March 29, 1916.

Pig Iron.—Local sellers have had a fairly active week and some large amounts of iron are under inquiry, particularly in New England and in New York State. Recent basic transactions have included 3000 tons for New England and 4000 tons for a New Jersey steel plant. In the latter case a further purchase is pending or has been closed. The buying of basic at Harrisburg last week amounted to about 12,000 tons. In New York State a 5000-ton malleable transaction was put through and several fair-sized lots of foundry iron. At Buffalo one interest is pretty well sold up for the year, and another producer there has a limited amount of iron to offer for the third and fourth quarters. Pending business includes 8000 to 10,000 tons in one case, 4000 or 5000 tons in another, and 1000 to 2000 tons in a third. One New England buyer has bought 2000 tons and is still in the market for 2000 to 3000 tons. Deliveries are for the second and third quarters in some instances, in others for the second half, and occasionally there is buying for the third quarter alone. A New Jersey foundry has closed for 1000 tons and another in that district for 500 tons. Prices are higher with those sellers whose quotations have been rather lower than the average. Some of the prices recently realized have not been advanced, but the change due to the buying of the last two weeks has rather been to reduce the interval between the lowest and highest prices. The New England embargo is still a handicap, and there has been no raising of it even for a day in the past week. Among pending inquiry is one for a round lot of basic. We quote at tidewater as follows for early delivery: No. 1 foundry, $20.75 to $21.25; No. 2 X, $20.50 to $20.75; No. 2 plain, $20 to $20.50; Southern iron at tidewater, $20.75 to $21 for No. 1 and $20.25 to $20.50 for No. 2 foundry and No. 2 soft.

Ferroalloys.—Aside from the standard 80 per cent British ferromanganese, the quotation for which for 1917 delivery is $175, seaboard, a domestic alloy of 50 to 60 per cent manganese is selling on contract for $5 to $5.50 per unit at furnace and a 40 to 50 per cent alloy at about the same price. A Western producer has been making a 30 to 35 per cent alloy which has sold at $85 to $110 per ton delivered. An alloy of 25 to 30 per cent has also sold on a similar basis. Standard spiegeleisen, 19 to 21 per cent manganese, has been advanced to $65 to $70, furnace, for last half delivery and some sales have been made at the former quotation. For spot spiegeleisen of 17 to 19 per cent, $90 per ton has been asked. Inquiries for about 5000 tons of spiegel for early delivery have appeared in the past week, but they could not be satisfied. Standard ferromanganese for immediate delivery is also very scarce. Some small lots have gone at $400, and $425 has been asked for 50 tons, but there was no sale. Prospects for increased domestic production of ferromanganese are brighter each week. Besides the arrangements at Sheridan, Pa., the Meily furnace at Lebanon, Pa., will be operated to convert Brazilian ore. Still another company will smelt in its own blast furnace ore from an American deposit. It is also understood that an eastern Pennsylvania steel company is about to resume the making of ferromanganese. More of the British product is available for 1917 delivery, but the desire to absorb it has abated. Ferrosilicon, 50 per cent, continues active. Some early delivery material sold recently at $95 per ton, but the contract price is still $83 to $85, Pittsburgh.

Structural Material.—Industrial plant extensions and railroad work constitute the bulk of new business offered. The outlook is for a continuation of the present rate of contracting for structures for a long enough time to make 1916 easily a busy year. Postponements are constantly met with, but the prevailing opinion is that they are no greater in importance than in normal times, only more attention is paid to the emphasis placed on the high prices. Indeed, it is felt that withdrawals for this cause are a factor of stability, in that they are likely to form the sources of new business should there be a cessation of buying, due to the close of the war or for other reasons, long enough for the mills to gain some headway against present well-filled order books. Fabricators have, say, three months' work ahead; but, owing to the condition of the mills and the relatively small amount of plain material covered by contracts, prices at which the steel is figured vary widely. The variation is in part due to the different degrees of urgency of the fabricated work, with the probability that $20 per ton hardly measures the range between the immediate job and the one which may be delivered in a few months. Meanwhile deliveries are interfered with by the congestion on the railroads. The new railroad inquiries include 350 tons for Pier 17, Barclay Street, for the New York Central; 250 tons for the Chesapeake & Ohio, Richmond; 500 tons for nine bridges for the Pennsylvania; 1000 to 1200 tons for the Southern, and 1600 tons for the Boston Elevated and the City of Boston. Some 200 tons for the Baltimore & Ohio has been closed, and the American Bridge Company has been awarded 700 tons for the Interborough for reinforcing the Second and Third Avenue lines. To building work under consideration may be added 450 tons for an apartment house, Riverside Drive and 158th Street; 500 tons for an apartment at 409 Park Avenue, and 500 tons for the Madison Avenue Presbyterian Church house. Awards in general lines embrace 600 tons for the Kahn residence, Cold Spring Harbor, L. I., to the Eastern Steel Company, which also has 200 tons for a parochial school at Troy, N. Y.; 600 tons for the Y. W. C. A., Baltimore, to the Jones & Laughlin Steel Company; 1300 tons for sugar mills in Cuba, to the Virginia Bridge & Iron Company, and 300 tons for the New York Shipbuilding Company, to the McClintic-Marshall Company. The Levering & Garrigues Company is low bidder on the 1700-ton loft for P. W. Rouss. It is doubtful if plain material may be obtained for less than 2.50c., Pittsburgh, or 2.669c., New York, and as high as 3c., Pittsburgh, is asked for near-by delivery, with 3.10c., New York, out of warehouse.

Steel Plates.—While 3.50c., Pittsburgh, has been done within a few days on large offerings for early shipment the bulk of new buying appears to be at 3.75c., Pittsburgh, with prices ranging regularly to over 4½c., Pittsburgh, depending on quantity and time allowed for delivery. Recent sales of several carloads have been made at 4.40c. to 4.60c., Pittsburgh, for shipment in two weeks. Meanwhile the warehouse price is 4c., New York. Future buying, as for cars, can apparently be done at 2.60c., Pittsburgh, with cases of future deliveries as high as 3.15c. Some round tonnages for export have figured back to 3.50c., Pittsburgh. The outlook for car buying at the moment is not particularly bright.

Iron and Steel Bars.—Some round lots of steel bars available for substantially immediate shipment have sold for 3c., Pittsburgh, and in the absence of information to the contrary this would seem to be the market for such bars as may be obtained. Iron bars remain at 2.40c., Pittsburgh, or 2.569c. to 2.669c., New York, with deliveries in several weeks, but higher iron prices are looked for. Store prices are minimum at 3.10c., New York.

Cast-Iron Pipe.—Niagara Falls, N. Y., opens bids to-day on its requirements for this year, which are estimated at about 2400 tons. Hartford, Conn., will open bids March 30 on 1565 tons of 6 to 20 in. Acushnet, Mass., will open bids April 3 on about 200 tons of 4 to 10 in. Municipal lettings are not numerous at present, but the volume of private buying keeps up remarkably well. Inquiries are constantly being received for good quantities. Carload lots of 6-in., class B and heavier, are now quoted at $30.50 per net ton, tidewater, class A and gas pipe taking an extra of $1 per ton. This advance is due to the higher cost of labor and of pig iron and other raw materials. Cast-iron pipe has for a long time been relatively much cheaper than other finished products.

Old Material.—A better demand from consumers is being experienced for heavy melting steel scrap, relaying rails, rerolling rails, old carwheels and old steel axles. Axles are higher because of the demand from consumers who are having difficulty in securing a sufficient supply of rerolling billets. Eastern Pennsylvania prices on heavy melting steel scrap have advanced

somewhat, so that they are more nearly approaching a parity with Pittsburgh prices. Brokers are paying about as follows to local dealers and producers, per gross ton, New York:

No. 1 heavy melting steel scrap (railroad or equivalent)	$15.75 to $16.00
Yard heavy steel (east. Pa. specifications)	15.25 to 15.75
Relaying rails	23.50
Rerolling rails	16.50 to 17.00
Iron car axles	25.50 to 26.00
Steel car axles	26.50 to 27.00
No. 1 railroad wrought	20.75 to 21.00
Wrought-iron track scrap	18.00 to 18.50
No. 1 yard wrought, long	17.00
No. 1 yard wrought, short	16.00
Light iron	7.50 to 8.00
Cast borings (clean)	9.00 to 9.25
Mixed borings and turnings	8.00 to 8.25
Wrought pipe	13.25 to 13.50
Old carwheels	15.00 to 15.50
Malleable cast (railroad)	12.75 to 13.25

Foundries continue to be good buyers of cast scrap, owing to the persistent interference with deliveries of pig iron by railroad congestion. Dealers' quotations to consumers of cast scrap are as follows, per gross ton, New York:

No. 1 cast (machinery)	$18.00
No. 2 cast (heavy)	16.50
Stove plate	$12.00 to 12.50
Locomotive grate bars	12.00 to 12.50

Buffalo

BUFFALO, N. Y., March 28, 1916.

Pig Iron.—Sales for the week in this district totaled 22,000 to 25,000 tons of foundry grades and malleable for last half delivery. Furnaces report inquiry coming along in good volume and that a large number of buyers seem to be sounding the market. The inquiry that has appeared is for definite quantities and better than noted for some time. Producers here believe that the opening of navigation will be delayed by ice beyond the normal time. Some furnacemen are quoting iron for last half delivery at 50c. per ton over first half prices, but there is no quotable change in the schedule of last week which is continued as follows for current and last half delivery, f.o.b. furnace, Buffalo:

No. 1 foundry	$19.50 to $20.00
No. 2 X foundry	19.00 to 19.50
No. 2 plain	18.75 to 19.00
No. 3 foundry	18.75 to 19.00
Gray forge	18.75 to 19.00
Malleable	19.00 to 20.00
Basic	19.00 to 20.00
Bessemer	21.00 to 22.00

Finished Iron and Steel.—There is apparently a growing tendency on the part of buyers to place specific orders rather than to make blanket contracts for future specification. This is due in part, undoubtedly, to their definite needs for material and their ability to make up specifications for shipment at mills' convenience. While a good many buyers feel that the prices asked to-day will hold for the year, there seems to be some question about the future beyond that time, and as the mills are unwilling to sell beyond the present year there is little inclination toward forward contracts just now. The demand for cold rolled steel continues strong and many distributers claim to be practically sold out and unable to obtain material fast enough to keep their stocks replenished. The demand for wire products continues heavy, with a disinclination on the part of some mills to entertain further obligations. Many tin-plate buyers are picking wasters to tide them over. The order for reinforcing bars for the Donner Steel Company's ore dock, 1100 tons, has been placed with the Corrugated Bar Company, Buffalo. The John W. Cowper Company, Buffalo, general contractor for the Isco Chemical Company's new plant at Niagara Falls, has placed an order with the Ferguson Steel & Iron Company, Buffalo, for the 250 tons of reinforcing bars required, to be shipped from stock, having been unable to get delivery from any mill within the time required. The contractor has also placed order with the Ferguson Company for 100 tons of structural steel for this plant.

Old Material.—The scrap market was in a dormant state for a number of days and it looked as though a reaction was about to set in, but within the past 24 hours a considerable demand has again appeared for heavy melting steel, resulting in the booking of a number of good sized orders and causing the price to advance $1 per ton. Dealers also report that the firming up of the pig-iron market has had a bearing on corresponding lines of scrap. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$18.00 to $18.50
Low phosphorus steel	21.00 to 21.50
No. 1 railroad wrought scrap	19.00 to 19.50
No. 1 railroad and machinery cast scrap	16.00 to 16.50
Old steel axles	24.00 to 24.50
Old iron axles	24.00 to 24.50
Old carwheels	15.25 to 15.75
Railroad malleable	16.00 to 16.50
Machine shop turnings	8.50 to 9.00
Heavy axle turnings	12.50 to 13.00
Clean cast borings	9.25 to 9.75
Old iron rails	18.00 to 18.50
Locomotive grate bars	12.00 to 12.50

British Steel Market

Domestic and American Billets Very Scarce—General Situation Firm

(*By Cable.*)

LONDON, ENGLAND, March 29, 1916.

Pig iron is firm, owing to a reduction in stocks. Inquiries for export are good. Hematite pig iron is firm and unchanged. Iron-ore freights are now controlled. Tin plates are strong at 31s., with good inquiries from France and the Orient.

Domestic billets are almost unobtainable. American 4-in. open-hearth billets are $55, c.i.f., Liverpool, for May and June delivery. Quotations, partly nominal, of some materials are as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 31s., against 30s. 6d. last week.

Cleveland pig-iron warrants, 86s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £19 15s.

Steel ship plates, Scotch, delivered local yards, £13 10s.

Steel rails, export, f.o.b. works, port, £11.

Hematite pig iron, f.o.b. Tees, about 135s.

Sheet bars (Welsh) delivered at works in Swansea Valley, £13 10s.

Steel bars, export, f.o.b. Clyde, £17 10s., compared with £17 5s. a week ago.

Ferromanganese, £35, nominal.

Ferrosilicon, 50 per cent, c.i.f., £27.

German and British Pig-Iron Prices

The German pig-iron syndicate has fixed its scale of prices for the period from March 1 to June 30, 1916, advances being made because of higher coal, coke and ore. The new quotations are as follows:

	Marks per Metric Ton
Foundry No. 1	96 to 102
Foundry No. 3 (according to place of delivery)	91 to 96
Puddling iron	90.5
Siegen steel making iron	93.5
Steel making iron low in copper	113.0
Spiegel iron	114.5
Siegen mixing iron, gray	102.0
Siegen mixing iron, mixed	101.0
Siegen mixing iron, white	100.0

Commenting on the cheapness of German iron even at these prices as compared with the British prices, the German papers print a comparison which is as follows in shillings:

Pig Iron	Before the War	To-day	Actual Advance	Advance, Per Cent
	German Prices			
Hematite	78s. 6d.	122s. 6d.	44s.	56
Foundry No. 1	74s. 6d.	96s.	21s. 6d.	29
Foundry No. 3	69s. 6d.	91s.	21s. 6d.	31
	British Prices			
Hematite	60s.	135s.	75s.	125
Scottish foundry pig No. 1	59s. 6d.	98s. 6d.	39s.	66
Middlesbrough No. 3	50s.	88s.	38s.	76

Operations will begin in the Louisville Steel & Iron Products Company plant in Louisville, Ky., before the end of April, according to R. A. McDowell, vice-president. C. H. Mynahan, of Chicago, has been appointed manager of the company and is in charge of the work of rehabilitating the old plant of the Louisville Bolt & Iron Company. The company will specialize on sheet iron, and orders are on hand, it is stated, to keep the plant operating for several months.

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 73.9c. on plates, structural shapes and sheets, and 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees 3 in. and over, 2.50c. to 2.75c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs	.10
Angles, 3 in. on one or both legs less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Handrail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive.	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 2.75c. to 3.75c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers:

Rectangular plates, tank steel or conforming to manufacturers standard specifications for structural steel dated Feb. 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3/16 in. take the price of 3/16 in.

Allowable overweight, whether plates are ordered to gage or weight to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gages under ¼ in. to and including 3/16 in.	.10
Gages under 3/16 in. to and including No. 8	.15
Gages under No. 8 to and including No. 9	.25
Gages under No. 9 to and including No. 10	.30
Gages under No. 10 to and including No. 12	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths under 3 ft. to 2 ft., inclusive.	.25
Cutting to lengths under 2 ft. to 1 ft., inclusive.	.50
Cutting to lengths under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Wire Rods.—Bessemer, open-hearth and chain rods, $57, nominally.

Wire Products.—Prices to jobbers, effective Feb. 29: Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent discount in 10 days, carload lots, annealed, $2.25; galvanized, $2.95. Galvanized barb wire and staples, $3.25; painted, $2.55. Wire nails, $2.40. Galvanized nails, 1 in. and longer, $2 advance over base price; shorter than 1 in., $2.50 advance over base price. Woven wire fencing, 61½ per cent off list for carloads, 60½ off for 1000-rod lots, 59½ off for less than 1000-rod lots.

The following table gives the price per 100 lb. to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$2.30	$2.35	$2.40	$2.45	$2.60	$2.70	$2.80	$2.90
Galvanized	3.20	3.25	3.30	3.35	3.40	3.55	3.90	4.00

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from March 29, 1916, on black and galvanized steel and iron pipe, all full weight:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	65	33½	¼ and ⅜	54	22
½	69	49½	⅝	55	23
¾ to 3	72	53½	½	59	36
			¾ to 1½	62	41

Lap Weld

2	68	49½	1¼	51	30
2½ to 6	71	52½	1½	57	37
7 to 12	67	47½	2	58	38
13 and 14	58½	..	2½ to 4	60	41
15	56	..	4½ to 6	60	41
			7 to 12	58	39

Reamed and Drifted

1 to 3, butt	70	51½	¾ to 1½, butt	60	39
2, lap	66	47½	1¼, lap	49	28
2½ to 6, lap	69	50½	1½, lap	55	35
			2, lap	56	36
			2½ to 4, lap	58	39

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	61	38½	⅜	54	32
½	66	48½	½	59	41
¾ to 1½	70	52½	¾ to 1½	63	43
2 to 3	71	53½			

Lap Weld, extra strong, plain ends

2	66	48½	1½	58	38
2½ to 4	69	51½	2	60	41
4½ to 6	68	50½	2½ to 4	62	44
7 to 8	63	43½	4½ to 6	61	43
9 to 12	58	38½	7 to 8	54	36
			9 to 12	49	31

Butt Weld, double extra strong, plain ends

½	57	41½	½	46	29
¾ to 1½	60	44½	¾ to 1½	49	32
2 to 2½	62	46½			

Lap Weld, double extra strong, plain ends

2	58	42½	1½ to 2	47	29
2½ to 4	60	44½	2½ to 4	49	34
4½ to 6	59	43½	4½ to 6	47	32
7 to 8	52	33½			

To the large jobbing trade an additional 5 per cent is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Sheets.—Makers' prices for mill shipment on sheets, of U. S. standard gage, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	2.85 to 2.95
Nos. 9 to 10	2.90 to 3.00
Nos. 11 and 12	2.95 to 3.05
Nos. 13 and 14	3.00 to 3.10
Nos. 15 and 16	3.10 to 3.20

Above prices are for Bessemer stock. For open-hearth stock $2 per ton advance is charged.

Box Annealed Sheets, Cold Rolled

Nos. 17 to 21	2.55 to 2.65
Nos. 22 and 24	2.60 to 2.70
Nos. 25 and 26	2.65 to 2.75
No. 27	2.70 to 2.80
No. 28	2.75 to 2.85
No. 29	2.80 to 2.90
No. 30	2.90 to 3.10

Above prices are for Bessemer stock. For open-hearth stock $2 per ton advance is charged.

Galvanized Sheets of Black Sheet Gage

Nos. 10 and 11	3.75 to 4.00
No. 12	3.85 to 4.10
Nos. 13 and 14	3.85 to 4.10
Nos. 15 and 16	3.95 to 4.20
Nos. 17 to 21	4.10 to 4.35
Nos. 22 and 24	4.30 to 4.55
Nos. 25 and 26	4.45 to 4.70
No. 27	4.60 to 4.85
No. 28	4.75 to 5.00
No. 29	4.90 to 5.15

Above prices are for Bessemer stock. For open-hearth stock $2 per ton advance is charged.

Boiler Tubes.—Discounts on less than carloads, f.o.b. Pittsburgh, freight to destination added, on lap-welded steel tubes, in effect from March 29, 1916, and standard charcoal-iron tubes, effective from Feb. 29, 1916, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1½ in.	39	1½ in.	37 to 38
1¾ and 2 in.	51	1¾ and 2 in.	41 to 42
2¼ in.	48	2¼ in.	38 to 39
2½ and 2¾ in.	54	2½ and 2¾ in.	45 to 46
3 and 3¼ in.	59	3 and 3¼ in.	49 to 50
3½ to 4½ in.	60	3½ to 4½ in.	51 to 52
5 and 6 in.	53	5 and 6 in.	45 to 46
7 to 13 in.	50		

Locomotive and steamship special charcoal grades bring higher prices.

1¾ in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Extras for Cold Rolled Strip Steel

Following are the standard extras for commercial cold rolled strip steel, adopted and made standard by the Institute of Cold Rolled Strip Steel Manufacturers at a meeting in New York City, March 15, 1916:

Base price $——— per 100 lb. for 1½-in. and wider, 0.100 in. and thicker, hard temper, in coils, extras to be added to base for size, annealing, cutting, packing, etc., as follows: (Amounts shown below are per 100 lb.)

Extra for Thickness

0.100 in. and thicker	Base
0.050 in. to 0.099 in.	$0.05
0.036 in. to 0.049 in.	0.20
0.035 in.	0.20
0.031 in. to 0.034 in.	0.35
0.026 in. to 0.030 in.	0.45
0.025 in.	0.45
0.020 in. to 0.024 in.	0.55
0.017 in. to 0.019 in.	1.35
0.015 in. to 0.016 in.	1.75
0.013 in. to 0.014 in.	2.45
0.012 in.	2.80
0.011 in.	3.15
0.010 in.	3.50

Extra for Annealing

0.100 in. and thicker	$0.25*
0.050 in. to 0.099 in.	0.25*
0.036 in. to 0.049 in.	0.25*
0.035 in.	0.25*
0.031 in. to 0.034 in.	0.40*
0.026 in. to 0.030 in.	0.40*
0.025 in.	0.40*
0.020 in. to 0.024 in.	0.40*
0.019 in. to 0.010 in.	No extra for soft temper

*Add for all tempers except hard.

Extra for Narrow Widths

Under 1½ in. to 1 in. inc.:	
0.100 in. and thicker to 0.010 in.	$0.15
Under 1 in. to ½ in. inc.:	
0.100 in and thicker to 0.010 in.	0.30

Extra for Wide Widths

Wider than 6 in., not over 9 in.:	
0.031 in. to 0.034 in.	$0.15
0.026 in. to 0.030 in.	0.15
0.025 in.	0.25
0.020 in. to 0.024 in.	0.25
0.017 in. to 0.019 in.	0.50
0.015 in. to 0.016 in.	0.50
0.014 in. to 0.010 in.	*
Wider than 9 in., not over 12 in.:	
0.035 in.	0.40
0.031 in. to 0.034 in.	0.40
0.026 in. to 0.030 in.	0.40
0.025 in.	0.60
0.020 in. to 0.024 in.	0.60
0.017 in. to 0.019 in.	0.75
0.016 in. to 0.010 in.	*
Wider than 12 in., not over 15 in.:	
0.036 in. to 0.049 in.	0.25
0.035 in.	0.50
0.031 in. to 0.034 in.	0.60
0.026 in. to 0.030 in.	0.75
0.025 in. to 0.010 in.	*

*Extras quoted on application.

Extra Cutting to Length

24 in. and longer.	
1 in. and wider:	
0.100 in. and thicker	$0.10
0.050 in. to 0.099 in.	0.15
0.036 in. to 0.049 in.	0.15
0.035 in.	0.15
0.031 in. to 0.034 in.	0.25
0.026 in. to 0.030 in.	0.40
0.025 in.	0.40
0.020 in. to 0.024 in.	0.50
0.017 in. to 0.019 in.	1.10
0.015 in. to 0.016 in.	1.10
0.013 in. to 0.014 in.	1.50
0.012 in.	2.00
0.011 in.	2.00
0.010 in.	2.00
Under 1 in. to ½ in., inc.:	
0.100 in. and thicker	0.25
0.050 in to 0.099 in.	0.50
0.036 in. to 0.049 in.	0.50
0.035 in.	0.50
0.031 in. to 0.034 in.	0.75
0.026 in. to 0.030 in.	1.00
0.025 in.	1.00
0.020 in. to 0.024 in.	1.25
0.017 in. to 0.019 in.	2.00
0.015 in. to 0.016 in.	2.00
0.013 in. to 0.014 in.	2.00
0.012 in.	Coils only
0.011 in.	Coils only
0.010 in.	Coils only

For cutting to lengths under 24 in. triple extras will be added.

Boxing or wrapping, $0.15 extra; minimum charge, $0.50.

Extras for Small Quantities

Orders for less than 100 lb. of one size will be accepted only at the full value of 100 lb.

Extras for gages lighter than 0.010 in. quoted on application.

On orders or contracts for 18 tons or more add extras only on items for less than 2000 lbs.

3 to less than 18 tons of one size	$0.10
1 to less than 3 tons of one size	0.25
1,000 lb to less than 2,000 lb. of one size	0.40
500 lb. to less than 1,000 lb. of one size	1.00
300 lb. to less than 500 lb. of one size	2.00
200 lb. to less than 300 lb. of one size	3.00
100 lb. to less than 200 lb. of one size	5.00

NOTE.—The charge for cutting to length does not relieve buyer from scrap loss, and short pieces left from cutting will be shipped and invoiced at price of long lengths. If lengths over 35 in. are ordered and no short pieces taken, add 10 per cent to net price.

Iron and Industrial Stocks

NEW YORK, March 29, 1916.

The stocks of companies having war contracts were the only ones in which the fluctuations of the past week were of any special consequence. The news of the week had little effect on stocks generally in either advancing or depressing them. Even the renewed activity of German submarines, with the reported loss of American lives on passenger steamships sunk, did not cause much decline. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.	28¼ - 30½	Ry. Steel Spring, pref.	96
Allis-Chal., pref.	76½ - 78⅞	Republic, com.	50 - 52¾
Am. Can, com.	60½ - 63	Republic, pref.	108¾-109¾
Am. Can, pref.	111 -112¾	Sloss, com.	56
Am. Car & Fdy., com.	67½ - 70½	Pipe, com.	22¾ - 23
Am. Car & Fdy., pref.	116	Pipe, pref.	52
Am. Loco., com.	72½ - 78½	U. S. Steel, com.	83⅝ - 85½
Am. Loco., pref.	103 -104	U. S. Steel, pref.	116¾-117
Am. Steel Fdries.	52¼ - 53¼	Westg. Electric.	64⅝ - 66⅞
Bald. Loco., com.	102¾-107½	Am. Rad., com.	395 -397
Bald. Loco., pref.	108¾-109⅛	Am. Ship, com.	46½ - 48
Beth. Steel, com.	470 -504	Am. Ship, pref.	90 - 91½
Case (J.I.), pref.	85	Chic. Pneu. Tool	71½ - 74¾
Colorado Fuel	43¼ - 47¼	Cambria Steel	81 - 81⅝
Gen. Electric	166½-168½	Lake Sup. Corp.	10 - 10⅝
Gt. No. Ore Cert.	43⅛ - 45⅛	Pa. Steel, pref.	98⅛
Int. Harv. of N. J., com.	110 -111¼	Warwick	10⅝ - 10¾
Int. Harv. of N. J., pref.	115¼ -118	Cruc. Steel, com.	84½ - 91⅝
Int. Harv. Corp., com.	70⅞ - 75	Cruc. Steel, pref.	115 -115⅝
Lacka. Steel	75¾ - 80⅛	Harb-Walk. Refrac., com.	84 - 84½
Nat. En. & Stm., com.	23½ - 25½	Harb-Walk. Refrac., pref.	102⅞-103
Nat. En. & Stm., pref.	94½	La Belle Iron, com.	50 - 52½
N. Y. Air Brake	140 -144	La Belle Iron, pref.	128¾-129¼
Pitts. Steel, pref.	98	Am. Brit. Mfg., com.	26
Pressed Stl., com.	53 - 54½	Can. Car & Fdy., pref.	85
Pressed Stl., pref.	102 -102⅞	Driggs-Seabury	137 -142
Ry. Steel Spring, com.	39 - 40¾	Midvale Steel	65 - 66⅛

Dividends

The Pittsburgh Coal Company, regular quarterly, 1¼ per cent, payable April 25.

The American Locomotive Company, regular quarterly, 1¾ per cent on the preferred stock, payable April 21.

The Westinghouse Electric & Mfg. Company, regular quarterly, 1½ per cent on the common and 1¾ per cent on the preferred stock; common payable April 29 and preferred April 15.

The Nova Scotia Steel & Coal Company, regular quarterly, 2 per cent on the preferred stock, payable April 25.

The Scovill Mfg. Company, 8 per cent extra, in addition to the regular quarterly dividend of 2 per cent. In January and February of this year, extra dividends of 5 per cent were paid. Last year the company paid 8 per cent in regular dividends and 10 per cent in extra dividends, making 18 per cent for the year.

The American Shipbuilding Company, regular quarterly, 1¾ per cent on the preferred stock, payable April 15. Dividends have been suspended since Jan. 15, 1914.

The Sharon Steel Hoop Company, regular quarterly, 1¾ per cent, payable March 31.

The Steel Company of Canada, Ltd., regular quarterly, 1¾ per cent, and 3½ per cent balance in full of all back dividends, payable May 1.

The Washburn Wire Company, regular quarterly, 2 per cent on the common and 1¾ per cent on the preferred stock, payable April 1.

The American Screw Company, regular quarterly, 1¾ per cent, payable March 31.

The Missouri Malleable Iron Company, East St. Louis, Ill., on March 25 announced, effective as of March 6, an advance in the wage scale of the employees, except the officers and the office force, averaging 10 per cent. This action was voluntary, being the result of the increase of business. The company manufactures equipment for freight cars, etc. F. E. Nulsen, St. Louis, is president and John P. Pero is superintendent.

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
Mar. 23	27.12½	26.87½	49.50	8.00	8.00	18.00	17.75
24	27.12½	26.87½	49.50	8.00	8.00	17.75	17.50
25	27.12½	26.87½	50.00	8.00	8.00	17.75	17.50
27	27.12½	26.87½	....	8.00	8.00	17.75	17.50
28	27.12½	26.87½	50.00	8.00	8.00	17.75	17.50
29	27.12½	26.87½	50.00	8.00	8.00	17.75	17.50

NEW YORK, March 29, 1916.

Copper is quiet but firm. Tin is a trifle stronger, although the demand is not specially notable. Lead is quiet but strong, with producers unwilling to sell for export even at premium prices. Spelter is dull and easier. Antimony continues scarce and firm.

New York

Copper.—There has been some moderate buying, but on the whole the market has been quiet. The producers are waiting for renewed activity on the part of foreign buyers which, when it comes, will unquestionably make domestic buyers more active. Meantime the larger producers are maintaining their prices. Electrolytic for immediate shipment is still quoted at 28.50c., but a firm offer of 28c., cash, New York, would be accepted. April and May can be done at 27.25c. to 27.50c. and June and July at 27c., 30 days delivered, or 26.87½c., cash, New York. On March 22 there was some good inquiry but it could not be determined that business resulted, although the market was given a better tone. Some business in future positions was reported on March 24 at 27c., but only a moderate amount was taken. This week no activity whatsoever was reported. Lake is quoted at 27.12½c. for forward delivery. Rumors that the French Government is in the market for 2000 to 10,000 tons have been current, but no one seems to know much about the inquiries, and in some quarters it is surmised that the reports are put out to stimulate a dull market. The exports this month, up to and including yesterday, total 20,873 tons.

Tin.—The week as a whole has been a quiet one, although on March 23 and 24 there was a fairly good demand for April delivery, and, while plenty of buyers could be found for that position, sellers were few. It was suspected that some one was having trouble in finding tin wherewith to fill April contracts and consequently was eager to buy. On Monday there was some business in future shipments, perhaps 150 tons changing hands. Yesterday the market was dull, with 50c. asked for spot. The arrivals of the month have picked up considerably and up to yesterday 3803 tons had arrived. There is now afloat 4825 tons.

Lead.—Up to the end of last week the market was active, but since then quiet has prevailed. To domestic consumers the independent producers continue to quote 8c. at both New York and St. Louis. The leading interest adheres to its nominal quotation of 7c., with the understanding that any sales it makes will be settled on its average price. One of its officers has made a statement to the effect that his company does not operate along speculative or temporary lines; that more than 75 per cent of its product is sold on average price contracts; that it gives preference to its regular customers, and that it does not believe that extraordinary war demands should force domestic industry to pay prices that are not warranted by domestic consumption. Many interests have shown themselves averse to selling for export even at premium prices, and bids equal to 8.50c., St. Louis, for Pacific coast shipment have been refused, while domestic buyers were offered the metal at 8c. A week ago to-day there was a good demand on the basis of 8.25c., Chicago, and for the first time in the recollection of the trade lead was shipped to the West from New York. This week the market has been quiet and odd lots are beginning to be offered by second hands. The exports this month, up to and including yesterday, total 4001 tons.

Spelter.—Prompt shipments can be secured easily at 17.50c., St. Louis, or 17.75c., New York; April at about 17.25c., New York, and May at 16.50c. The market has been decidedly dull, and the number of sources from which offerings have come has greatly surprised the trade. Production has unquestionably been greatly increased and it is doubtful if prices can go much higher unless some extraordinary demand develops. The foreign situation has been made easier by the action of Great Britain in offering to subsidize smelters of Australian ores in England. The exports, up to and including yesterday, total 1405 tons.

Antimony.—The market continues strong, partly because of a good demand from Canada. The quotation for prompt Chinese and Japanese is unchanged at 45c. to 46c., duty paid. One Canadian buyer took 500 tons for delivery over the year.

Aluminum.—The quotation for No. 1 virgin aluminum, 98 to 99 per cent pure, is slightly stronger at 59c. to 61c.

Old Metals.—The market lacks animation. Dealers' selling prices are nominally unchanged, as follows:

	Cents per lb.
Copper, heavy and crucible	25.00 to 26.00
Copper, heavy and wire	24.00 to 25.00
Copper, light and bottoms	20.00 to 21.00
Brass, heavy	15.00 to 15.50
Brass, light	12.50 to 13.00
Heavy machine composition	18.00 to 19.00
No. 1 yellow rod brass turnings	16.00 to 16.50
No. 1 red brass or composition turnings	16.00 to 17.00
Lead, heavy	5.75
Lead, tea	5.25
Zinc	14.00 to 15.00

Chicago

MARCH 27.—The fairly active buying of copper the past week brought out a considerable range of prices, with minimum quotations slightly lower. Similar conditions obtained with respect to tin, while lead prices continued to move upward. We quote: Casting copper, 26c.; Lake copper, 27.50c.; tin, carloads, 50.75c., and small lots, 52.75c.; lead, 8.25c.; spelter, 17.75c.; sheet zinc, 25c.; Cookson's antimony, 50c.; other grades, 48c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 22c.; copper bottoms, 20c.; copper clips, 21c.; red brass, 18c.; yellow brass, 14c.; lead pipe, 6.50c.; zinc, 13.50c.; pewter, No. 1, 28c.; tinfoil, 37.50c.; block tin pipe, 42.50c.

St. Louis

MARCH 27.—Non-ferrous metals are firm at the following prices, with the demand and transactions good: Lead, 8.60c.; spelter, 19.50c.; tin, 54c.; Lake copper, 28.50c.; electrolytic copper, 28c.; Asiatic antimony, 50c. In the Joplin ore district zinc blende was held firmly, ranging from $95 to $115 per ton, with premium grades as high as $121. The average for the week's production was $97. Calamine sold on a range of $70 to $85, with the district average for the week's sales $73. Lead ore sold at $100, with the average for the week $98. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 10.50c.; heavy yellow brass, 13.50c.; heavy red brass and light copper, 16c.; heavy copper and copper wire, 20c.; zinc, 12c.; lead, 5.50c.; pewter, 24c.; tinfoil, 33c.; tea lead, 3.50c.

Stockholders of the Foundry & Machine Works, Harrisburg, Pa., at a meeting held March 23 elected officers and directors as follows: President and general manager, Christian W. Lynch; vice-president, W. P. McKenzie; secretary and treasurer, B. E. Taylor; directors, James K. Brady, William Jennings, George W. Reiley, W. P. McKenzie, W. O. Hickok, 3d, David Fleming and C. W. Lynch.

Samuel E. Fairchild, Jr., has been elected president of the Cruse-Kemper Company, Ambler, Pa., manufacturer of gas holders, etc.; H. W. Scattergood, vice-president and treasurer; Robert L. Wood, secretary. Martin Stokes and Andrew Wheeler, of Philadelphia, have been elected members of the board of directors.

American Trade with Europe Following the War

The following paragraphs are taken from a letter received at the office of THE IRON AGE from a New York business man who recently passed through England and afterward crossed to Paris:

"Everything in Europe in a business way is being figured on what will be done after the war. Manufacturers realize that there will be new conditions all over the world. They are counting on the Germans and Austrians having government co-operation and on the different manufacturers working in unison to capture foreign markets. For that reason the manufacturers of Great Britain and France realize that they must make every possible preparation and take an aggressive attitude. They are glad to discuss these problems now and they can even be shown they should start their operations before the war ends. In this connection it should be pointed out that American manufacturers must not content themselves with any fancied security which the present war conditions give them, because after the war there will be the most strenuous competition all over the world that has been seen in the history of industry. British manufacturers are studying efficiency and are eager to learn new methods which will enable them to turn out their product more economically and distribute it more effectively.

"There is much comment about the prejudices which will exist after the war. It is generally believed in France and Great Britain that Austria and Germany will be unable to do business with any of the present allies, hence they will be forced to go after the markets of the United States and South America. The manufacturers of the allied countries feel that they must also prepare a strenuous campaign in American markets because there is where the money will be, hence where the most profitable trade will be obtained.

"If America succeeds in staying out of the war it will be practically the telephone central of the world, because it can have communication and do business with the countries on both sides of the conflict. It is very essential at this time that a study be made of each of these countries to see what it has been obtaining previously from its present enemies. If Germany has been purchasing quantities of cotton goods from England there will be a big chance for American cotton goods in Germany after the war. If England has been purchasing hosiery from Germany there will likewise be a great opportunity for American hosiery in England. Since Russia has been one of the large customers of Germany there will be a chance for all kinds of American products in Russia."

British Manganese-Ore Imports Declining

Manganese-ore imports into Great Britain in February were 24,511 gross tons, against 32,111 tons in January, 1916, and 25,364 tons in February, 1915. Imports thus far in 1916 show a decline from 1915, amounting to 56,622 tons for the first two months, against 64,777 tons for the first two months of 1915. The 1915 monthly average was 31,443 tons. Brazilian manganese ore, 50 per cent, is quoted at 97 cents per unit, while Indian ore, 50 per cent, is 64 cents per unit, this year's shipment east coast, and 63 cents per unit, west coast.

Including the United States Steel Corporation, which has recently entered into a license agreement for the use of the Orth roof construction for open-hearth furnaces, the following companies are now licensees under the Orth patents: Alan Wood Iron & Steel Company, Youngstown Sheet & Tube Company, Commonwealth Steel Company, United Steel Company, Inland Steel Company, Upson Nut Company, American Steel Foundries and Carbon Steel Company.

The Charcoal Iron Company of America, Detroit, Mich., has acquired the 2500-ton boat Cicoa, which will be used exclusively in shipping ore from upper Lake ports and pig iron from Detroit to lower Lake ports for Eastern shipment.

Canadian Industrial Notes

TORONTO, March 25, 1916.—The Canada Car & Foundry Company, Montreal, has received another large order for railroad equipment, etc., from the French Government, which will total several million dollars. The new contract, with equipment orders now on hand amounting to about $5,000,000, promises continued activity in the company's car shops for some months, altogether apart from the shell business. The Russian shell order, it is stated, is working out satisfactorily, shipments going forward at regular intervals and without further technical or financial difficulties.

The Northern Bolt & Screw Company, Owen Sound, Ont., recently closed a large contract for nails for shipment to one of the largest wholesale houses in New Zealand. It is expected that this is the forerunner of a number of such orders to be placed in Canada.

David Maxwell is interested in a company which will commence construction work at an early date on a steel plant and rolling mill at Oshawa, Ont. George A. Lee, 703 Traders Bank Building, Toronto, is secretary of the company.

The Stanley Steel Company, Ltd., Hamilton, incorporated with a capital stock of $2,500,000, will have plans prepared at once for a steel plant. A. F. Hatch, 73 Sherman Avenue, Hamilton, is vice-president.

The Kingdon Mining, Smelting & Mfg. Company, Ltd., Montreal, has been incorporated with a capital stock of $750,000 by Louis A. David, Adhemar G. Munick, S. H. R. Bush and others to manufacture steel, iron, machinery, etc.

Railroad Car Building

Early buying of cars in quantity by the Pennsylvania, New York Central or other systems is not expected by car builders. Except for large inquiries for abroad, there are at present less than 2500 cars likely to be placed in the early future, and these are made up chiefly by 2000 cars for the Chicago & Northwestern and 300 stock cars for the Illinois Central. This last road has, it is stated on good authority, decided not to buy 1000 cars of other types, and some doubt is expressed that 1000 cars for the Mobile & Ohio are an early certainty. In the foreign field, some 4000 cars for the Italian State Railways are live, but other foreign inquiries, including the long-deferred Russian purchase, are slow in settlement. The Carnegie Steel Company is to buy 80 cars, mostly gondolas, and the Calumet & Arizona Mining Company 30 tank cars.

Upward of 4000 cars have been contracted for, including 1000 cars for the New York Central, and 1000 50-ton dump cars for the Erie, both taken by the Standard Steel Car Company; 1000 cars for the Reading, divided equally between the Standard and the Pressed Steel Car Companies, and 500 automobile cars placed with the American Car & Foundry Company.

Germany's High Pig-Iron Month of the War

Germany's pig-iron output in January, 1916, was 1,077,046 metric tons, which is the largest for any month since the war started. The best previous record was 1,076,343 tons, in October, 1915. The January, 1915, output was 874,133 tons. The January, 1916, production was made up as follows: Foundry iron, 164,401 tons; Bessemer iron, 16,875 tons; Thomas or basic iron, 682,576 tons; steel-making iron and spiegeleisen, 191,354 tons, and puddle iron, 21,840 tons. The Rhineland-Westphalian district produced 374,734 tons of the total.

The W. A. Jones Foundry & Machine Company, Chicago, which purchased a few years ago a large plant site on Twelfth Street between Forty-fourth and Forty-fifth avenues, has just placed contracts for the erection of a one-story foundry, in which floor space of approximately 100,000 sq. ft. will be provided. The foundry will have a production of about 50 tons per day, the melting equipment to include the 63-in. cupola now at the company's North Side plant and a new No. 9 cupola. It is expected that the foundry will be ready for operations in the early fall.

More Heroult Electric Furnaces

Eight additional Heroult electric steel furnaces have been licensed to operate by the United States Steel Corporation. They are as follows:

The Timken Roller Bearing Company, Canton, Ohio, will install two 6-ton furnaces for making steel billets for conversion into seamless tubes. The company at present buys its billets.

The W. P. Taylor Company, Buffalo, N. Y., will install one 2-ton furnace for making steel castings. This company at present produces converter castings.

The Connecticut Electric Steel Company, Inc., will install a 2-ton furnace for producing steel castings. This is a newly organized company and its location is not yet made public.

The Latrobe Electric Steel Company, Latrobe, Pa., will install one 6-ton furnace in addition to the 6-ton and 3-ton Heroult furnaces now operating and producing tool and special steels.

The Hess Steel Corporation, Baltimore, Md., will install one 6-ton in addition to a 6-ton already ordered. The output will be special steels.

The Vanadium Alloys Steel Company, Latrobe, Pa., will install one 3-ton furnace to make tool steels. The company now produces such steels in crucibles.

The Electric Alloy Steel Company, Chicago, Ill., will install one 1-ton furnace for making tool and special steels.

The installation of these eight furnaces will make a total of 55 Heroult furnaces in the United States and Canada, 12 of these having been sold since Jan. 1, 1916.

The Michigan Steel Castings Company, Detroit, Mich., started operating its second Heroult furnace on Feb. 21, 1916; the Armstrong, Whitworth Company of Longueuil, Canada, took the first heat from its 3-ton furnace last Friday, March 24; the United Steel Company, Canton, Ohio, started its second furnace, a 15-ton, on Feb. 20 last; the Latrobe Electric Steel Company, Latrobe, Pa., its second furnace, a 3-ton, on Feb. 22 last; the Alabama Power Company, Anniston, Ala., its first 6-ton furnace on March 18, while the Crucible Steel Castings Company, Cleveland, Ohio, took the first heat from its 1-ton furnace last Saturday, March 25.

The Simonds Mfg. Company Lockport, N. Y., the Buckeye Steel Castings Company, Columbus, Ohio, the Belle City Malleable Iron Company, Racine, Wis.; the Harrow Spring Company, Kalamazoo, Mich., and the Universal Rolling Mill Company, Bridgeville, Pa., will soon take the first heat from their new furnaces.

The American Bridge Company, which fabricates the Heroult furnaces, will hereafter make all furnaces under 6 tons at Ambridge, Pa., confining the 6-ton and larger furnaces at its plant at Pencoyd, Pa., where heretofore all furnaces have been built.

New Japanese Steel Plants

Japanese papers state that a boom is being experienced in the steel and metal trades of the country and give some prominence to a movement for the organization of a new steel plant, with $10,000,000 capital, to be located in Kyushu. An adequate supply of good ore from China is counted on.

Plans for a third extension to the plant of the Government Iron Works at Edamitsu are reported, to be carried out immediately on the completion of the second extension. Capital for the contemplated extension is $17,928,000, to be spread over five years, with the intention of increasing the annual production 300,000 tons. Arrangements are understood to have been made for the purchase of all the required machinery through government agencies overseas. Ores are imported from China, Chosen and other continental mines. The output of steel for 1916 will be probably 330,000 tons.

Another report is that a large iron works is to be established in Hokkaido. The increase of Japan's capacity for producing iron and steel is considered most urgent. A new iron mine near Kuchian, Hokkaido, estimated to contain 7,000,000 tons of ore, is attracting attention.

The Sherritt & Stoer Company, Inc., 603 Finance Building, Philadelphia, has been appointed exclusive sales agent for the Beaudry Champion and Peerless power hammers for the Philadelphia district.

Youngstown Indictments Against Steel Companies Quashed

The indictments returned March 8 against various steel companies at Youngstown, Ohio, charging conspiracy to fix the prices of steel products and of labor were quashed by Judge W. S. Anderson in the Common Pleas Court at Youngstown, March 28. The local companies indicted were the Carnegie Steel Company, Youngstown Sheet & Tube Company, Republic Iron & Steel Company, Youngstown Iron & Steel Company and Brier Hill Steel Company. The United States Steel Corporation and its chairman, Judge E. H. Gary, were indicted at the same time. Judge Anderson held that the indictments were too indefinite and uncertain, also that as labor is not a commodity, as definitely indicated in the Clayton bill, no crime could be charged in that connection under the Valentine law, the Ohio statute under which the indictments were brought. He pointed out further that the indictments failed to limit the offenses to acts committed within the State, in this respect conflicting with the Clayton law which has to do with interstate commerce. The prosecuting attorney has indicated that he may carry the case to a higher court for a review of Judge Anderson's decision.

The indictments followed the riots at East Youngstown at the beginning of the year, in connection with strikes at the works of the Youngstown Sheet & Tube Company and Republic Iron & Steel Company.

National Tube Company's New Gary Mill

Some official information has been given out at Pittsburgh relating to the new pipe mill to be built by the National Tube Company of Pittsburgh at Gary, Ind. The plant, which will be located near the works of the Indiana Steel Company, will be absolutely self-contained and will make pipe from the ore to the finished product. It will have its own ore docks, equipped with the most modern unloading machinery, and with sufficient storage capacity to provide ore for the blast furnaces when lake navigation is closed. Four blast furnaces will be built, each with a daily capacity of 550 to 600 tons of pig iron; a Bessemer steel plant, to have two 12-ton converters; two 40-in. blooming mills, with power station and waterworks; two continuous skelp mills; a universal plate mill; a sheared plate mill, and five lap and five butt weld furnaces. Auxiliary buildings will comprise a coupling shop, galvanizing shop, jobbing shop, machine and blacksmith shops and a very large warehouse. No open-hearth furnaces are now contemplated, but any open-hearth steel to be used will be supplied by the Indiana Steel Company. The plant will have a monthly capacity of 40,000 tons or more of steel pipe, ranging from ⅛ in. to 24 in. No contracts for equipment or construction have yet been placed, but it is the intention to push work as fast as possible, and have the plant ready for making pipe in about a year from the time work actively starts.

New Process Steel Corporation Plans

A proposal to increase the capital stock of the New Process Steel Corporation, Lancaster, Pa., manufacturer of drill rods, alloy steel and cold-drawn shapes, will be acted upon at a special meeting of the stockholders to be held shortly. It calls for an increase from $50,000 to $1,000,000, the new stock consisting of $450,000 common and $500,000 preferred. The corporation has obtained options on ten acres of land adjoining its plant and has started building operations which will largely increase its production. The new plans include an arrangement under which the Hyatt Roller Bearing Company, Newark, N. J., will take a considerable amount of the Lancaster company's products.

The Lackawanna Steel Company is building at its Lackawanna, N. Y., plant a merchant mill to be known as No. 10 mill and intended for the rolling of smaller sizes. It will probably be ready for operation late in the year.

Machinery Markets and News of the Works

BUSINESS MORE NORMAL

Large Order for Engine Lathes Reported

Securing Adequate Working Forces a Problem—Small Orders Are the Rule—Active Growth of Factory Facilities

That the machinery trade is fast getting back to a normal condition is indicated by the general report that the bulk of demand now consists of individually small orders which spring from domestic needs. The number of new factories and additions to old ones in every part of the country is most impressive, and cannot fail but mean the foundation of a long period of healthy business, unless there comes some unlooked-for adverse change in general conditions. All that hampers a greater business in standard machine tools than that now being done is inability to make sufficiently prompt deliveries, and getting labor to operate new installations.

Although not much is being said about it, makers of single-purpose lathes which were designed for the manufacture of shells are finding increasing difficulty in selling these machines. This especially applies to tools made by concerns which ventured into the machine tool field shortly after the war demand became heavy. They encountered unexpected troubles and delays that made the task more difficult than was first thought, consequently they were not prepared to begin deliveries until the crest of the demand had passed.

A feature of the demand from munitions manufacturers is the heavy call for machine parts which are required to replace parts of machines which are crippled by forcing the tools, or by careless or unskilled labor.

Getting skilled help is a great problem, largely because of the number the munitions plants have absorbed. They have not yet obtained a satisfactory number.

An interesting item from Cincinnati states that lathe builders in that city have received an order for part of approximately 500 18-in. and 24-in. engine lathes which was placed by an Eastern company believed to have a large contract with the United States Government, presumably for munitions.

The Schatz Mfg. Company, Poughkeepsie, N. Y., contemplates the erection of a plant, 60 x 200 ft., 2-stories in height, for the manufacture of ball bearings. With equipment, the new plant will cost about $250,000. The company is in the market for motor-driven equipment.

The number of new plants and extensions in New England is especially notable.

Among the notable items from the Philadelphia territory is one stating that the Midvale Steel Company, Nicetown, has awarded a contract for a machine shop, 183 x 290 ft., to cost about $125,000.

Orders for single machines predominate in Cleveland, but their aggregate is equal to maximum production. In that city railroads are doing some buying, but not a great deal. The demand for cranes is so great that some makers are practically out of the market.

The Gier Pressed Steel Company, Lansing, Mich., plans an expenditure of $100,000 for machinery to equip new buildings. The Standard Motor Truck Company, Detroit, plans the erection of an addition 120 x 150 ft.

Foote Brothers, Chicago, makers of cut gears, will erect a 5-story addition, 75 x 100 ft., to cost about $75,000. The Ogren Motor Company, Waukegan, Ill., has awarded the contract for the erection of a factory which will cost about $300,000 for the buildings alone.

Good reports come from Birmingham, Texas and St. Louis. In Texas the Studebaker Corporation will install about $50,000 worth of machinery in an assembling plant at Dallas. The Chevrolet Motor Car Company will construct a large assembling plant at Fort Worth, Tex.

Orders for shells continue to be received by the Imperial Munitions Board at Ottawa, Canada. The new orders require quick deliveries and strict adherence to specifications.

New York

NEW YORK, March 29, 1916.

Business in machine tools is quieter, not so much because of any lessening of domestic demand, as because of the inability to get prompt deliveries of the standard tools for which the call is now greatest. Another restraining influence is the shortage of labor which is restricting the operations of a great many manufacturers. The munitions makers and automobile shops are still energetic in taking on at high wages every man they can find.

Some of the munitions makers in the East are instructing common laborers to perform one or a few operations on a single machine, and this is partly responsible for a shortage in this class of help. One plant doing shell work is contemplating the employment of women on hand screw machines. They have been found adaptable to loading fuses and like work. In Delaware the explosives industry has engaged thousands of men, including machinists, paying them abnormal wages, so that it is difficult to find an industrial plant that has a sufficient number of men. Meanwhile strikes are still on in Wilmington machine shops.

At least a few munitions makers are hopelessly behind in their contracts, and hints are heard that rejections are becoming more numerous, it is contended not always with justice. It was recently reported that the allied governments were short of fuses, yet on the heels of this it is said that a plant of unquestioned reputation for good and close work has been unsuccessful in having a large percentage of its production passed by the foreign inspectors. It therefore has many thousands of dollars tied up in unaccepted parts.

The foreign demand is quieter, but even if the demand were brisk greater difficulty than ever would be experienced in finding freight space for shipments inasmuch as more vessels have been withdrawn from ordinary service. Jose Camprubi, 29 Broadway, New York, has issued a list which specifies over 100 tools for shipment to Spain.

Plans for selling machine tools in Europe after the war are being steadily agitated by interests already organized, or about to organize. A large export company which has done a large and varied war business has approached several tool builders with a view of representing them after the close of hostilities. The company is new to the machine-tool field. The tool builders are considering the subject of foreign representation with a great deal of conservatism.

The Safety Car Heating & Lighting Company has bought the machines for which it was inquiring. C. A. Schneible, Inc., 132 East 121st Street, New York, is in the market for brass-working machinery. The Baltimore & Ohio Railroad is advertising for a few tools. Also in the market are the Bell Electric Motor Company, Garwood, N. J., and the International Arms & Fuse Company, Bloomfield, N. J.

Makers of cranes are extremely busy, and there is a large amount of attractive business in prospect. There is a suggestion that some of the purchasing may be deferred for a time, but sooner or later it must come to an issue.

The Unexcelled Mfg. Company, Woolworth Building, New York City, has acquired 170 acres on George's Road, New Brunswick, N. J., but as yet has taken no action for utilizing it. E. J. Bingle is president.

The American Brass Forging Company, 120 Broadway, New York, which was incorporated last November with a capital stock of $50,000 to manufacture guns, projectiles, cannon, etc., has increased its capital stock to $150,000. It is equipping its plant, which it recently purchased from the New York Piano Hardware Company, 168 Southern Boulevard, New York, with additional units for brass forging, machining and stamping, and expects to be equipped shortly to take on some very large orders for this kind of work. The company is no longer interested in the manufacture of ordnance, as specified in its incorporation papers; but plans to cater to domestic business and in the future will not undertake any war contracts. G. W. Coughlan is president and treasurer, I. Brooks Clarke is vice-president and F. E. Hallfeld is secretary.

The Kent Vacuum Cleaner Company, Rome, N. Y., has increased its capital stock from $25,000 to $100,000, and has under consideration the erection of a new plant for its regular line of manufacture. F. T. Kent is president.

The Johnson Machine Tool Company, manufacturer of machine tools, mill, mine and quarry machinery, Gouverneur, N. Y., recently incorporated, has taken over the plant and business of the Johnson Iron Company at Gouverneur. It is manufacturing 14-in. sensitive drill presses and sand pumps for quarries and mines, rock crushers and parts. It is also doing some factory and mill supply business. S. W. Hartley is president and manager and E. G. Hartley is secretary.

F. G. Leibe & Son, 39 Grafton Avenue, Newark, N. J., manufacturers of medicine chests, surgical cases, etc., are having plans drawn for the construction of a two-story addition, 40 x 60 ft., to its plant.

The Ransome Mixer Company, 35 West Thirty-ninth Street, New York City, has been incorporated with a capital stock of $50,000 to manufacture a concrete mixer of one bag of concrete per batch capacity. It will also handle a complete line of standard mixers and will act as representative for the Insley line of spouting. A. W. Ransome is president.

The Schatz Mfg. Company, Poughkeepsie, N. Y., manufacturer of hardware specialties, ball bearings, casters, sheet metal, etc., proposes to erect a new plant, 60 x 200 ft., two stories, for the manufacture of ball bearings. It will be started about April 15 and it is to be completed by July 1, at a total cost with equipment of about $250,000. It will be of unit type to allow for future expansion. The company is now in the market for high-grade tool room equipment. The special equipment for the manufacture of ball bearings has already been contracted for. Motor drive will be used throughout the plant. H. A. Schatz is treasurer.

The Durham Duplex Razor Company, 490 Montgomery Street, Jersey City, N. J., whose plant was damaged by fire March 19 with a total estimated loss of $340,000, advises that the exact amount of its loss is impossible to state at this time. Some of the machinery came through in fairly good shape, while other parts of the equipment were totally destroyed. T. C. Sheehan is vice-president.

The W. S. Rockwell Company, 50 Church Street, New York, furnace engineer and contractor, plans the construction of a new plant, but details have not yet been determined.

The Lubricating Metal Company, manufacturer of bearing metal, metallic packing and die cast bearings, 2 Rector Street, New York, bought a site in Jersey City, 75 x 93 ft., at Newark and Van Winkle avenues, and will eventually erect a plant for the manufacture of bearing metal.

The Utica Pipe Foundry Company plant, Utica, N. Y., has been sold to unnamed interests. The manufacture of cast-iron pipe, which was suspended a few years ago, when the Utica Company went into bankruptcy, will be resumed. The property comprises about 52 acres, several buildings and equipment.

The Advance Auto & Appliance Corporation, Yonkers, N. Y., has been incorporated with a capital stock of $50,000 to manufacture automobiles and auto appliances. R. D. Fiet, 149 Buena Vista Avenue, A. M. Krug, Yonkers, and E. G. Schleicher, Ossining, are the incorporators.

The Gleason Works, Rochester, has let contracts for a machine shop addition to its plant on University Avenue, to cost $25,000.

Articles of incorporation have been issued to the Wilder-Pike Thermometer Company, Troy, N. Y., to manufacture thermometers and similar goods. The capital stock is $25,000. S. M. and H. P. Pike and W. P. Dauchy are the incorporators.

The Radio Engineering Company of New York has been incorporated at Albany to manufacture mechanical and electrical devices and appliances. The capital stock is $100,000 and the directors are R. W. Avery, F. A. Ramsey, Albany, and H. S. Coughlin, 36 Nassau Street, New York.

The Condor Aero Works, Inc., Buffalo, has filed articles of incorporation, with a capital stock of $25,000, to manufacture aeroplanes, etc. V. Burttner, M. Lear and G. M. Schafer, Buffalo, are the incorporators.

The J. P. Devine Company, Buffalo, manufacturer of vacuum drying and impregnating apparatus, is building a further addition and a steel crane runway at its plant at Clinton Street and the Erie Railroad. It has also leased the foundry of the Buffalo Pitts Company at Fougeron Street and the New York Central Railroad Belt Line to afford additional facilities for increasing its business.

The L. N. Whissel Lumber Corporation, Buffalo, has been incorporated with a capital stock of $50,000 to manufacture lumber and timber. L. N. Whissel, Cambridge and Warwick streets, Buffalo, and G. Vanse, Brooklyn, are the incorporators.

The Syracuse Terminal Warehouse Corporation, Syracuse, N. Y., recently incorporated, has completed plans for an eight-story warehouse, 80 x 300 ft., which it will equip with elevators and freight-handling machinery. H. E. Jones and F. C. King are the directors.

The Dellwood Elevator Company, Buffalo, has commenced the construction of a 1,000,000-bu. grain elevator on the Buffalo River, Pennsylvania Railroad and Buffalo Creek Terminal Railroad. It will be of reinforced concrete and will cost $250,000.

The Sizer Forge Company, Buffalo, has let contracts for a new forging plant at Larkin Street and the Lake Shore Railroad. The structural steel contract was awarded to the Ferguson Steel & Iron Company, Buffalo.

Philadelphia

PHILADELPHIA, PA., March 27, 1916.

The extremely cold weather of late has prevented the foundry supply trade from making its usual shipments of sand and other foundry supplies at this time with any degree of promptness, but with warmer weather this delay can be overcome very shortly.

The Hershey Machine & Foundry Company, Manheim, Pa., manufacturer of general foundry and machine work, is now operating its plant by electricity. It is about to erect a new machine shop, 53 x 150 ft., and has already placed the building contract. J. H. Nissley is secretary.

The J. W. Paxson Company, manufacturer of foundry supplies and equipment, 1021 North Delaware Avenue, Philadelphia, advises that the damage to its engine room and its machine shop was slight. H. M. Bougher is president.

The Myers Machine Tool Company, Columbia, Pa., has practically doubled its output since September, 1915, when it removed its works to its present location, where it has since built additions. It is contemplating adding another part to its factory, but has not fixed upon the details. Most of its machinery output is at present being shipped abroad. C. S. Myers is president and general manager.

The Pennsylvania Equipment Company, Coleman Building, Philadelphia, is in the market for one 15 to 20-ton locomotive crane with magnet, three 36-in. passenger coaches, 100 Roger ballast cars, one 50-ton railroad crane or derrick car, one charging machine and one 30-ton ladle crane of 60-ft. span, all second-hand. J. E. Bough is manager.

The Victor Talking Machine Company, Camden, N. J., has awarded contract to Irwin & Leighton, 126 North Twelfth Street, Philadelphia, for the construction of a new cabinet factory, six stories, to cost about $450,000, and to be completed in about five months.

The Atlas Ball Company, Second Street and Glenwood Avenue, Philadelphia, awarded contract to the William Steele & Sons Company, 1600 Arch Street, Philadelphia, for the construction of a one-story concrete and steel blacksmith shop, 120 ft. long, to cost about $12,000.

The Frick Company, Waynesboro, Pa., manufacturer of refrigerating equipment, has completed improvements to its plant at a cost of about $5,000.

The Craig Ridgway & Son Company, manufacturer of steam and hydraulic machinery, Coatesville, Pa., while it has sufficient orders to run double turn, finds the labor situation so serious that it is impossible to get men. Munition plants are now offering such inducements that smaller manufacturers are crowded out of the labor market, except to the extent with which they are able to retain their steady, reliable workers. An instance of the inducements being offered is embodied in an offer made by a nearby company of 60c. an hour for an 8-hr. day to molders.

James F. Burns, manufacturer of electrical specialties, 715 Cherry Street, Philadelphia, has taken bids for a five-story factory addition of brick, 37 x 80 ft., from plans drawn by

Koelle, Steth & Co., Twenty-sixth and Oxford streets, Philadelphia.

The Lee Tire & Rubber Company, Conshohocken, Pa., has awarded contract to the John W. Ferguson Company, United Bank Building, Paterson, N. J., for a two-story brick factory building, 80 x 134 ft., to be used for the manufacture of rubber surgical goods, which will release space for increasing the manufacture of its steel-clad pneumatic rubber tires.

The Midvale Steel Company, Nicetown, Philadelphia, Pa., has awarded contract to Barclay, White & Co., 1530 Chestnut Street, Philadelphia, for the construction of a one-story brick machine shop, 183 x 290 ft., to cost about $125,000.

Fitzgibbon & Crisp, Inc., manufacturer of automobile bodies, Trenton, N. J., has about completed its new plant, consisting of a main building, one story, 90 x 700 ft., which is situated on a site 254 x 805 ft., and equipped with 900 ft. of railroad siding. A complete unit motor-driven equipment has been installed. L. L. Woodward is secretary and treasurer.

The Welsbach Company, Gloucester, N. J., received bids March 15 for the construction of a three-story brick and reinforced concrete factory to be added to its plant.

The Dairymen's Supply Company, Philadelphia, has been incorporated with a capital stock of $30,000 by Alfred G. Stees and John B. Crawford, Lansdowne, Pa. E. E. Barry, Aldan, Pa., and Howard M. Lutz, Llanerch, Pa., to manufacture separators and other dairy supplies and machinery.

The Dixon Valve & Coupler Company, Philadelphia, has been incorporated with a capital stock of $25,000 by F. R. Hansell, Land Title Building, Philadelphia; George H. B. Martin, Camden, N. J., and S. C. Seymore, Camden, N. J., to manufacture couplers, clamps and articles from brass, steel, bronze and other metals.

New England

BOSTON, MASS., March 27, 1916.

Little that is new can be said about the freight congestion and embargoes in New England. A shortage of coal is general, and many plants, notably the large electric power companies, are literally operating from hand to mouth. The embargoes on outgoing freight are holding up many loaded cars and the embargoes on incoming freight are still in full force. The press teems with reports of the various methods employed to help overcome the shortage in raw materials and the express companies and the trolley freights are becoming as seriously overburdened as the railroads. The one hope lies in the continuance of the spring weather which has prevailed generally for the past four days. The snow has gone rapidly in the cities and this will permit the full loading of motor trucks and teams. It is expected that the activities and the investigations of the Interstate Commerce Commission will help to find a way to relieve congestion and hasten the return to normal conditions.

About 900 employees of the Union Hardware Company, Torrington, Conn., walked out on strike, March 20. The trouble arose over the discharge of a workman and because of some discontent about overtime payments. The next morning the employees voted to accept the company's offer of a 10-per cent raise in wages, and returned to work. Wages are to be raised 5 per cent April 1 and a second 5 per cent June 1. After a strike lasting a week, about 400 men of the Reece Buttonhole Machine Company returned to work under a new agreement. They were granted an 8-hr. day with 9-hr. pay, time and a half for overtime and double time for Sunday and holidays, the abolition of the efficiency system and the recognition of a shop committee composed of two union men, two non-union men, and a fifth member to be selected by these four. The strikers at the H. B. Smith Company, Westfield, Mass., voted March 20 to return to work under the same conditions as existed when they went out and production is once more nearly normal in both plants of the company. The strike of the machinists at the Fisk Rubber Company, Chicopee Falls, Mass., continues in force and there is a small strike on in the hammer department of the Rhode Island Perkins Horse Shoe Company, Valley Falls, R. I.

Three large shops and several smaller buildings at the New Haven yards of the New York, New Haven & Hartford Railroad were destroyed by fire March 26, causing a loss of about $700,000. The boiler shop was one of the buildings consumed.

The Plume & Atwood Mfg. Company, Thomaston, Conn., has had plans drawn for an addition to its casting shop.

The Beaton & Cadwell Company, New Britain, Conn., is having plans drawn for an addition, 45 x 100 ft., six stories. Plans will not be ready before May 1.

The Fore River Shipbuilding Company, Quincy, Mass., has signed contracts for three vessels; two 9000-ton tankers for the Mexican Petroleum Company and one 14,000-ton freighter for the Edward F. Luckenbach Company, of New York. This is the fifth ship that the company has under way for the Luckenbach Company.

The Atlas Iron Works, Bridgeport, Conn., has been incorporated with capital stock of $10,000 to deal in iron, steel, etc. The incorporators are Charles Zukerman, Farrell, Pa.; Abraham Zukerman and Abraham Shapiro, Bridgeport.

The Brown & Sharpe Mfg. Company, Providence, R. I., has awarded a contract for the erection of a building, 50 x 135 ft., with ell 40 x 50 ft., six stories.

The P. P. Emory Company, Springfield, Mass., will be the lessee of a brass foundry, 64 x 91 ft., four stories, which is to be erected by George W. Kimball.

The Bullard Machine Tool Company, Bridgeport, Conn., has awarded a contract for an addition, 48 x 108 ft., five stories.

The Newburyport Gas & Electric Company, Newburyport, Mass., is asking bids on an extension to its power plant, 75 x 125 ft., one story and basement.

The H. H. Mayhew Company, Shelburne Falls, Mass., has been incorporated with capital stock of $85,000 to manufacture mechanics' tools. C. E. Bell is president, V. A. Converse, Springfield, treasurer, and J. H. Curley is additional incorporator.

The Connecticut Brass Company, Cheshire, Conn., is having plans drawn for a factory in West Cheshire, 38 x 140 ft., one story, and an office building, 38 x 40 ft.

The Worcester Electric Light Company, Worcester, Mass., has engaged engineers to prepare plans for an extension to its power plant, 68 x 78 ft.

The American Steel & Wire Company, Worcester, Mass., is to build an addition to a factory on Prescott Street, 55 x 140 ft., two stories.

The Bridgeport Brass Company, Bridgeport, Conn., has secured a permit for an extension to its power house on Housatonic Avenue.

The Providence Gas Company, Providence, R. I., has awarded a contract for the erection of a generator house, 57 x 127 ft., two and one-half stories; a purifier house, 61 x 112 ft., two and one-half stories; an exhauster and pump house, 41 x 66 ft., one story, and a tar extractor and washer house, 34 x 38 ft., one and one-half stories.

The National Electric Utilities Corporation, Danbury, Conn., has been incorporated with capital stock of $200,000 to manufacture electrical devices. The incorporators are Arthur E. Tweedy, Leopold Levy, Martin H. Griffing, John McCarthy, Martin R. Abrial, D. Frank Stevens, Charles D. Parks, Frank H. Lee and Charles A. Mallory.

The National Marine Lamp Company, Bristol, Conn., has been incorporated with capital stock of $500,000. The incorporators are Max M. Kotzen, New York City; Arthur Perkins and J. B. Darby, Hartford, Conn.

The Noble & Westbrook Company, Hartford, Conn., is having plans drawn for an addition, 35 x 60 ft., two stories.

The Boston Public Library, Boston, Mass., J. H. Benton, president of the board of trustees, is asking bids for a steam power, heating and ventilating plant to be installed in a building to be erected on Blagden Street.

The Gorham Mfg. Company, Providence, R. I., has awarded a contract for an addition, 40 x 120 ft., one story, to be completed in thirty days. This is the third building to be erected under rush orders for this company. A one-story addition, 122 x 144 ft., with ell, 35 x 56 ft., is just being completed.

The Adams Needle Company, Hill, N. H., has plans for an addition, 47 x 65 ft.

The Shelton Company, Shelton, Conn., has sold its bolt shop on Canal Street to the Derby Mfg. Company.

The Stanley Works, New Britain, Conn., has secured permits for the erection of four additions; one to be 35 x 145 ft., one story; the other three, about 20 x 145 ft. each.

The Birmingham Iron Foundry, Derby, Conn., has been granted a permit for a foundry building, 62 x 208 ft., with an ell, 40 x 140 ft.

The Hart & Cooley Mfg. Company, New Britain, Conn., has bought land adjoining its present property which will give space for future expansion.

The Colt's Patent Fire Arms Company, Hartford, Conn., is to build a hardening building, 32 x 40 ft., one story, and two storage buildings, 25 x 60 ft., one story.

The Holmes & Edwards Silver Company, Bridgeport, Conn., is adding one story to its three-story plant on Crescent Avenue.

The Standard Electric Time Company, Waterbury, Conn., has increased its capital stock from $60,000 to $100,000.

The Norfolk Mfg. Company, Norfolk, Conn., has increased its capital stock from $50,000 to $100,000. The company plans to erect a factory, 50 x 100 ft., two stories.

The Bridgeport Screw Company, Bridgeport, Conn., has awarded a contract for an addition, 100 x 150 ft., two stories.

The Royal Equipment Company, Bridgeport, Conn., is to add another story, 36 x 136 ft., to its plant on Railroad Avenue.

The Bradley & Hubbard Mfg. Company, Meriden, Conn., is to build an addition, 34 x 34 ft., to its foundry and is to add an additional story to its factory building.

The Modern Mfg. Company, Bridgeport, Conn., has been incorporated with capital stock of $10,000 to manufacture machinery, tools, hardware, etc. The incorporators are John S. Pullman, Edward J. McManus and Gabriel Mosivitz.

Detroit

DETROIT, MICH., March 27, 1916.

The Standard Screw Products Company, Detroit, has increased its capital stock from $50,000 to $100,000.

The Standard Motor Truck Company, Detroit, has acquired a site, 120 x 150 ft., adjoining its plant and contemplates the erection of an additional manufacturing building in the near future.

The General Aluminum Brass Mfg. Company, Detroit, has let the contract for an addition to its plant.

The United Electrical Mfg. Company, Adrian, Mich., has been incorporated with $50,000 capital stock to manufacture electric devices and automobile parts. It has secured a factory and will begin operations at once. The directors include Karl F. Wagner, Walter T. Haley and D. B. Hayes.

The R. J. Tower Motor Truck Company, Greenville, Mich., has been incorporated with $50,000 capital stock to manufacture automobile trucks. The incorporators are R. J. Tower, Francis Tower and C. V. Coats.

It is announced by W. H. Wallace, general manager Michigan Sugar Company, Detroit, that extensive improvements will be made to the various plants with the view of increasing their activity.

The Detroit Axle Company, Detroit, manufacturer of automobile axles, has increased its capital stock from $50,000 to $100,000.

The Campbell, Wyant, Cannon Foundry Company, Muskegon Heights, Mich., has increased its capital stock from $150,000 to $400,000.

The Positive Nut & Lock Company, Grand Rapids, Mich., has increased its capital stock from $100,000 to $200,000 and will extend its manufacturing facilities.

An expenditure of $100,000 for machinery for the Gier Pressed Steel Company, Lansing, Mich., is contemplated. It has broken ground for the construction of its factory buildings, which are to cost $100,000.

The Blood Brothers Machine Company, Allegan, Mich., has authorized the sale of its property and assets.

Baltimore

BALTIMORE, MD., March 27, 1916.

Officials of the Imperial Canners, Ltd., of Canada, are expected to visit Baltimore this week to look over facilities for filling part of the $90,000,000 contract for army rations for the Allies. It is stated that should they be unable to make arrangements for securing sufficient cans they may consider the establishment of a plant in that city. Joseph P. Kennedy, president of the P. Kennedy Foundry Company, Baltimore, has been elected a vice-president and director of the Canadian company named.

William F. Zeller & Co., Inc., sheet metal manufacturers, 1119 Denver Street, Baltimore, will have constructed a two-story steel workshop, 70 x 114 ft., at a cost of about $10,000. Contract has been awarded the West Construction Company, Knickerbocker Building, Baltimore.

The American Radiator Company, 1004 Munsey Building, Baltimore, has purchased a lot, 200 x 200 ft., at Carey and Wicomico streets and is expected to shortly begin the construction of a warehouse.

Thomas H. Bowles, 709 Title Building, Baltimore, is named as the purchaser of a tract of land at Curtis Bay, Md., and it is rumored that a shipbuilding plant will be established.

Announcement has been made that the plant of the F. X. Ganter Company, Ostend and Leadenhall streets, Baltimore, manufacturer of showcases and store fixtures, which was destroyed by fire, will be rebuilt.

With $50,000 capital stock the Automatic Pump Corporation, Norfolk, Va., has been chartered. L. C. Parker is secretary.

The Jordan Carbureter Company, Basic City, Va., has been incorporated with $300,000 capital stock by L. F. Jordan and others.

The Wilmington & Philadelphia Traction Company, Wilmington, Del., is considering the installation of equipment to furnish heat to the merchants in the business section of the city.

A. Freeborn Brown, president of the Maryland Metal Cross Tie Company, 627 Munsey Building, Baltimore, states that Thornton W. Price, Woolworth Building, New York, is working on plans for the company's plant.

Chicago

CHICAGO, ILL., March 27, 1916.

Circumstances are working together to make for a more desirable situation in the machinery market. The business of last week was much more largely of a normal character, being made up of single-tool orders and small lots of machines for regular customers of the machinery houses. To meet this demand much better deliveries of new tools are appearing, one dealer being in receipt of more than a dozen new lathes of a standard line. With this easing up of the new tool situation, less pressure is evident in the search for second-hand tools although this business continues exceedingly brisk. Sales of machinery from Chicago into the South and Southwest have been noteworthy in recent weeks. There has been no closing as yet of recent railroad inquiries and no additional lists of importance have appeared. The demand for foundry equipment is unusually heavy, in keeping with the marked activity in foundry expansion. A typical instance appears in the case of the Illinois Malleable Iron Company, Chicago, which, having just completed an addition to its gray iron foundry, 50 x 180 ft., has been compelled to provide more core room space, for which purpose a further addition, 40 x 90 ft., is being erected.

A. Finkel & Sons, 1322 Cortland Street, Chicago, are building a one-story brick machine shop addition to their plant.

The Auto Starter Company, Chicago, has been organized with a capital of $2,500 by W. H. F. Miller, J. A. Diephouse, R. B. McKinney, 3751 North Avers Avenue, and A. E. Henshen, Jr.

The Goddard Tool Company, 351 West Chicago Avenue, Chicago, has incorporated with a capital of $5,000, the organizers being K. B. Goddard, Fred A. Bahr, Frank S. Simons.

The J. M. Keeley Garage Company, Chicago, has been organized with a capital of $15,000 by F. T. Timke, M. V. Keeley and A. L. Bartholomew.

The Midland Chemical Company, Chicago, has had plans prepared for a two-story manufacturing plant, 119 x 161 ft., to be erected at Argo.

The Ogden Auto Sales & Garage Company, Ogden and Springfield avenues, Chicago, will build a one-story garage and a two-story shop, 46 x 52 ft., to cost approximately $37,000.

The Chicago & Northwestern Railway, W. H. Finley, engineer, has let the contract for a two-story brick power house, 82 x 125 ft., to be erected at South Chicago at a cost of $400,000.

J. H. Rosberg, 642 North Kedzie Avenue, Chicago, will build a two-story shop, 100 x 150 ft., for the manufacture of metal specialties.

Foote Brothers, North Carpenter Street, Chicago, makers of cut gears, will erect an addition to their factory, five stories, 75 x 100 ft., to cost about $75,000.

The Robinson Supply Company, Robinson, Ill., is preparing plans for the erection of a one-story machine shop and foundry.

The Ogren Motor Company, Waukegan, Ill., has awarded contracts for the erection of its factory. An expenditure of $300,000 for buildings alone is contemplated. Fritz Foltz, 111 West Washington Street, Chicago, is the architect.

The Merkelbach Mfg. Company, recently organized at Muscatine, Iowa, has completed arrangements for the removal of its factory to Moline, Ill. It will manufacture agricultural machinery. A. J. Merkelbach, president, recently disposed of his interest in the Iowa Culvert & Sheet Metal Company, of which he was president.

The Peoria Canning Company, Peoria, Ill., is about to erect a three-story brick factory, 91 x 181 ft. Electrically driven machinery will be installed.

The Schwartz Machine & Vulcanizing Company's shop on

East Main Street, Belleville, Ill., was recently damaged by fire with a loss of $10,000 to the machinery equipment.

The United States Radiator Corporation, Chicago, has awarded contracts for additions to its Edwardsville, Ill., plant. The increased facilities will provide greater core room capacity and will call for the installation of additional equipment, including overhead trolleys.

The Muscatine & Iowa City Railway, Muscatine, Iowa, expects to begin the construction of shops and a roundhouse about April 1. A. D. Bowen is president.

The White Machinery Company, St. Paul, Minn., has been organized with a capital of $30,000 to manufacture garden tools. The incorporators are William Ivins, John L. Crump, both of St. Paul, and C. I. Cole, Kellogg, Minn.

Indianapolis

INDIANAPOLIS, IND., March 27, 1916.

The Kokomo Brass Company, Kokomo, Ind., has awarded the contract for a new brass and aluminum foundry, 55 x 300 ft., one and two stories. J. W. Johnson is manager.

The Cincinnati Pulley Machinery Company, Cincinnati, Ohio, has leased a plant at Richmond, Ind., for a branch factory. Equipment will be installed at once for the manufacture of drilling machines. J. George Hey is secretary and general manager.

The Portable Power Mfg. Company, La Porte, Ind., has been organized to manufacture a small two-cylinder gasoline engine for general farm use. G. L. Crook, formerly general superintendent of the Rumely Company, is president.

Bahr Brothers, Marion, Ind., are building a gray iron foundry, 54 x 200 ft., which is expected to be ready for operation May 1.

All the factories at Elkhart, Ind., affected by the strike of the Brass Workers' Union, are in operation again.

The Martin Band Instrument Company, Elkhart, Ind., has been sold to George Riley, Goshen, Ind., for about $120,000.

The Superior Sheet Metal Works, Indianapolis, has increased its capital stock from $15,000 to $20,000.

The Butler Mfg. Company, Knightstown, Ind., has moved to Indianapolis, where it has a location at 1120-24 East Georgia Street. It makes pistons, does cylinder grinding and conducts a general machine shop. Charles R. Butler is president.

An explosion wrecked the mill of the Ohio & Indiana Stone Company, Greencastle, Ind., March 24. Much of the machinery was damaged.

L. M. Robinson & Co., Inc., New Albany, Ind., has been organized with $10,000 capital stock to manufacture glue-testing machinery. The directors are L. M. Robinson, J. M. McManus and C. R. Turner.

The Loogootee Face Brick & Tile Company, Loogootee, Ind., has been incorporated with $50,000 capital stock to manufacture brick, tile, etc. Thomas H. Browning, Gustave M. Risacher and Edward A. Morse are the directors.

The Fort Wayne Electric Works, Fort Wayne, Ind., has let the contract for four additional factory buildings, the largest five stories, 75 x 421 ft. The completion of the buildings will mean doubling the working force, which is now 2500 hands.

Cleveland

CLEVELAND, OHIO, March 27, 1916.

Dealers are receiving a fair volume of orders for machine tools, but almost entirely for single machines. Considerable inquiry is pending, but no round lots of machinery are being figured on. The demand for automatic screw machines continues very active. Orders are coming in at production capacity so that makers are not catching up on deliveries, which are promised now for about twelve months ahead. New orders for automatic screw machines are well scattered among domestic users, the heavier demand coming from the automobile trade. The railroads are doing some buying. The New York Central Lines placed orders during the week for a wheel press and an axle lathe and wheel boring machine. The Ann Arbor Railroad has an inquiry out for a wheel press. Owing to the high prices asked for second-hand machinery dealers are reluctant to buy unless they feel sure of disposing of it without much delay. The demand for cranes continues heavy, but some makers are practically out of the market because they are unable to make reasonable deliveries.

The Republic Structural Iron Works Company, Cleveland, has purchased the site on which its plant is located and increased its capital stock, but denies the report that it is planning plant extensions. I. T. Kahn, president Republic Company, has just become president of the Duplex Hanger Company and Columbian Hardware Company, occupying adjoining plants.

The Properties Company, Cleveland, will erect a power building on East Seventy-second Street, near the New York Central Railroad, 160 x 250 ft., two stories, of reinforced concrete.

The Newburgh & South Shore Railroad, Cleveland, will erect an engine repair shop, 85 x 110 ft., and has placed orders for the equipment which will include about 15 machine tools and a 50-ton traveling crane.

The Foster Bolt & Nut Mfg. Company, Cleveland, has placed a contract for the erection of a new building, 27 x 126 ft.

The Woodard Machine Company, Wooster, Ohio, has been incorporated with a capital stock of $150,000 to operate the plant of the Canton-Hughes Pump Company, recently purchased by L. A. Woodard, formerly manager of the William Tod Company, Youngstown. The incorporators are L. A. Woodard, Charles O. Jones, Walter J. Mangey, E. C. Dix and J. C. McClaren.

The Akron Rubber Mold & Machine Company, Akron, Ohio, is building an addition to its plant, 60 x 115 ft., which will about double its capacity.

The Selas Company, Canton, Ohio, maker of gas engines, has secured a site adjoining the plant of the Zahner Metal Sash & Door Company, along the Pennsylvania Railroad, on which it will erect a new plant within the next few months.

The Napoleon Automobile Company, Napoleon, Ohio, has been organized to build automobiles and will occupy the plant of the Morning Star Threshing Machine Company.

The Pauck Machine Company, Toledo, Ohio, has established a plant at Summit and Michigan streets for the manufacture of button-making machinery. The machines were placed on the market by the Toledo Button Machine Company, which has just been incorporated with a capital stock of $350,000.

The Defiance Screw Machine Products Company, Defiance, Ohio, is erecting a one story steel addition, 50 x 125 ft., to its plant, which will double its capacity. It is the intention to have it ready for occupancy Aug. 1.

Milwaukee

MILWAUKEE, WIS., March 27, 1916.

Emil Belke, 419 North Third Street, Stevens Point, Wis., will establish an interior wood-working factory in the former Kobella shop, and is in the market for a small list of wood-working machinery, with individual electric motor drive.

Henry and Arthur Fiege, Bayfield, Wis., have opened a machine shop on Washington Avenue and have installed a complete equipment of lathes, shear, grinding machine and other tools, electrically driven. A garage department has also been established.

The New Idea Plaster Board Company, Fond du Lac, Wis., has decided to move its plant and offices to South Milwaukee, Wis., as soon as its new shop, 40 x 200 ft., is completed. Forty men are employed.

The Wisconsin Fire & Face Brick Company, Caswell Block, Milwaukee, has been incorporated with a capital stock of $15,000 to manufacture fire brick, flue lining, foundry supplies and building material. The incorporators are Emil M. Kraatz, John J. McCoy and Robert J. Steele.

The Wachsmuth Lumber Company, Bayfield, Wis., has made a large installation of oxy-acetylene welding and cutting apparatus in its machine shop and will do commercial work in addition to its own.

The Wisconsin Foundry Company, 1138-1150 Thirty-second Street, Milwaukee, has awarded contracts for building a third story on its pattern shop and vaults. T. L. Smith is president.

Bids are being taken this week on the erection of a new foundry and machine shop at Booth Street and Keefe Avenue, Milwaukee, for the Claus Automatic Gas Cock Company, now located at 2601 Vliet Street. It will be of brick and steel, 90 x 150 ft., one story and basement. The architects are Robert A. Messmer & Bro., 1004 Majestic Building.

The Milwaukee Brush Mfg. Company, Milwaukee, organized with $50,000 capital to manufacture brushes and brooms, has leased the Wright-Joys Building, 51-65 Erie Street, and is installing equipment. E. F. Streich is president.

The Auto Parts & Machinery Company, Milwaukee, has been incorporated with a capital stock of $7,500 by Peter Hott, William Koenig and Joseph P. Callan, attorney, to manufacture automobile parts and accessories and other mechanical specialties.

A. M. Johnson, deputy city clerk, Hayward, Wis., will

close bids April 11 for the erection of a 50,000-gal. steel tank and tower; one low service pump of 400 gal. per min. capacity and one fire pump of 1500 gal. per min. capacity. H. E. Rohlf is mayor.

The proposed new plant of the Wisconsin Iron & Wire Works, 186 East Water Street, Milwaukee, to be erected at Franklin and Booth streets, will consist of four units, 140 x 240 ft., of brick, concrete and steel, with part mill construction. G. H. Norris, secretary, will take bids on the general contract within a few days. The architect is Armand D. Koch, 1045 Wells Building.

The Kannenberg machine shop at Cedarburg, Wis., has been leased by Ralph and Wilmer Boerner, who have organized the Boerner Automobile Company and will operate a garage and commercial machine shop.

The W. Toepfer & Sons Company, iron works, 193 Broadway, Milwaukee, has awarded contracts for a shop addition to take care of the overflow from the present plant. Irving Toepfer is general manager.

Articles of incorporation have been filed in behalf of the Milwaukee Shaper & Transmission Appliance Mfg. Company, Milwaukee, capitalized at $75,000. Members of the law firm of Schmitz, Wild & Gross appear as incorporators and say they will not be able to make details public until later.

The Klumb Engine & Machine Company, organized recently at Sheboygan, Wis., has undertaken the production of a farm tractor and general utility truck for agricultural use. Nearly all the equipment has been provided for.

The Appleton Wood Products Company, Appleton, Wis., is having plans prepared by A. N. Gmeiner, architect, for a new factory unit, 40 x 170 ft., with basement.

Bids will be taken about May 1 for the construction of a new hospital group costing $350,000 for the Columbia Hospital Association at Frederick and Hartford avenues, Milwaukee. Schmidt, Garden & Martin, 104 South Michigan Avenue, Chicago, are preparing plans. Frederick L. Sivyer is president of the association.

C. J. Conohan, 378 Brady Street, Milwaukee, has been granted a permit to build a garage and repair shop at Brady Street and Warren Avenue, of brick, one story, 78 x 78 ft., at a cost of $7,500.

The Reichert Mfg. Company, 1440 Booth Street, Milwaukee, producing metal forms for concrete construction, etc., has increased its capital stock from $20,000 to $35,000 to accommodate its enlarged business. It is buying equipment from time to time as needed.

The Merton Dairy Products Company, Merton, Waukesha County, Wis., is preparing to erect a new laboratory, boiler house and garage, 10 x 39 ft., 47 x 52 ft., and 20 x 60 ft., respectively, all of brick and steel, one story and basement. A. E. Swager, 610 Majestic Building, Milwaukee, is the architect.

The Wood County Cooperage Company, Grand Rapids, Wis., will build a new factory unit, 40 x 120 ft., two stories, of brick. The architect is A. F. Billmeyer, Grand Rapids.

The Pittsville Hardware Company, Pittsville, Wis., is preparing to make an addition to its garage for a machine shop.

The Hamilton-Beach Mfg. Company, Racine, Wis., maker of electrical appliances and devices, formally opened its new plant March 20. Fred J. Osius is general manager.

The John Lauson Mfg. Company, maker of gas engines and farm implements, New Holstein, Wis., is now producing a general utility gas tractor and has increased its force more than 35 per cent. It is likely that the company will be compelled to make an addition to its plant in the fall.

Cincinnati

CINCINNATI, OHIO, March 27, 1916.

The demand for machine tools from domestic sources is increasing. A large Eastern company recently purchased approximately 500 lathes, about evenly divided between 18 and 24 in. sizes, part of the order being awarded to local firms. It is understood that the purchaser has a large contract from the United States Government. Makers of portable electric tools report business very good, but on account of sharp advances in all material entering into the construction of these machines it now seems certain that they will have to advance their prices. The paper mills in this section are very busy and constantly adding to their equipment. Makers of small gas engines are also increasing their manufacturing capacities.

The fast increasing number of vegetable canning plants in the Central West has developed a large demand for special canning equipment.

No change in the local labor situation is reported from any source.

The Mechanical Supplies Company, Cincinnati, has been incorporated with $10,000 capital stock by Jacob L. Mueller, Eugene A. Ritter, Daniel D. Mueller and Henry B. Sandmann. It will deal in machinists' and mill supplies.

The Elmwood Castings Company, Elmwood Place, Cincinnati, has decided to go ahead on the construction of a brick addition to its plant, 115 x 220 ft., one story.

The Macleod Company, Cincinnati, manufacturer of railroad and contractors' lighting outfits and other specialties, has leased a five-story building in West End, which will more than double its capacity.

August Maly, Cincinnati, furniture manufacturer, will soon move his factory to a four-story building at 1008-10 Richmond Street, and will add wood-working equipment.

The Cincinnati Lathe & Tool Company, Oakley-Cincinnati, has commenced work on a new office building and when finished the present office space will be devoted to manufacturing purposes.

The Queen City Watch Case Mfg. Company, Cincinnati, has been incorporated with $25,000 capital stock by F. G. Gruen and others. It is closely affiliated with the D. Gruen Company, which recently let contract for an addition to its plant.

The Ohio Gas & Electric Company, Lisbon, Ohio, has acquired the plant of the Middletown Gas & Electric Company, Middletown, Ohio, and has tentative plans under way for establishing a large central power plant at that point.

The Columbus Paper Products Company, Columbus, Ohio, has acquired a building at West Main and Canal streets that will be fitted up for manufacturing.

The foundry of the Ironton Malleable Iron Company, Ironton, Ohio, recently acquired by the Dayton Malleable Iron Company, Dayton, Ohio, will be put in operation before April 1. Considerable new equipment is being installed.

The Marion Die, Tool & Machine Company, Marion, Ohio, has been incorporated with $15,000 capital stock by Edwin Harrold, O. T. Roof, and others. Nothing is known as to manufacturing plans.

The Cleveland Machinery & Supply Company, Cleveland, Ohio, has obtained control of the Kern Machine Tool Company, Hamilton, Ohio, and will operate this plant in the future. No changes have yet been made in the personnel of the officers, and it is not yet known whether or not the name of the company purchased will be changed.

The Central South

LOUISVILLE, KY., March 27, 1916.

Capacity business is the rule with Louisville manufacturers. It is reported that orders are being taken conditionally in some lines, subject to ability to get material and for delivery at such times as they can be put through. Boilers, generators, motors and tools, ice and chilling machinery, are all in exceedingly good demand.

The Vendome Copper & Brass Works, Louisville, has taken out a permit to build an addition to its plant. It has six months' work on hand.

The James C. Wagner Company, tinner and roofer, has filed articles for incorporation listing $1,000 as capital stock.

H. M. Collins, A. W. Overton and C. W. Coleman have incorporated the Lexon Sawmill Company, Frankfort, Ky., with $300,000 capital.

The roundhouse and machine shops of the Louisville, Henderson & St. Louis Railroad at Cloverport, Ky., recently destroyed with a loss of $150,000, are to be rebuilt at once and new equipment installed. R. N. Hudson is president.

The plant of the Three States Lumber Company, Luxora, Ky., has been burned with a loss of $200,000.

The Kentucky Utilities Company, owner of the Mt. Sterling ice plant, is making improvements at a cost of $15,000. The capacity of the plant will be increased from 20 to 30 tons daily and an electric motor will supplant the steam drive.

An additional unit, to include steam turbine, motor, surface condenser, etc., will be installed by the Stearns Coal & Lumber Company, Stearns, Ky.

The Williamsburg Water Company, Williamsburg, Ky., is in the market for a turbine wheel for a maximum head of 6 ft.

A 150-hp. engine is being considered by the Campbellsville Public Utilities Company, Campbellsville, Ky., to increase its plant.

Mayor Bosse and V. C. Enlow, City National Bank, Evansville, Ind., are supporting a movement which would provide funds and a site for a refrigerator manufacturing plant which will cost $500,000.

The Fort Wayne Corrugated Paper Company has pur-

chased the Vincennes Board & Paper Company plant at Vincennes, Ind., for $216,729, and it is stated, will operate it.

The Hamilton Motor Company, Chattanooga, Tenn., is building a garage at Sixth and Chestnut streets, to be completed May 15.

The plant of the Carcolite Chemical Company, Copper Hill, Tenn., has been destroyed by fire.

Joe Baker and W. A. Lyle have purchased at a receiver's sale the property of the Dandridge Power & Light Company, Dandridge, Tenn., and will add a water power plant, etc.

The Tennessee Milling Company, Chattanooga, Tenn., has been incorporated with $15,000 capital by D. S. and S. W. Riddle, S. E. Whittaker, and others.

Excelsior-making machinery is to be purchased by the Colonial Lumber Company, Reardon, Tenn. J. D. Wyrick is manager.

Richard H. Green, Tipton, Tenn., is interested in a project to establish a hydroelectric plant on a river with 100 ft. wide, mile an hour flow, and is seeking data.

The National Waterproofing Company, Memphis, Tenn., will build two ten-story factory buildings.

The Gregory Talc Company, Nashville, Tenn., has been incorporated with $15,000 capital to make talc blackboards. J. Dallas Jacobs, Allen Hamilton, and others, are the incorporators.

The South Kentucky Power Company has the franchise at Adams, Tenn., to construct a municipal lighting system.

The Valley Creek Lumber Company, 526 Childs Street, Rochester, N. Y., will install a hardwood lumber plant with 25,000 ft. daily capacity, at Purden, Tenn., and will require band mill equipment.

Addition will be made to the equipment of the old Price-Ruhl Lumber Company plant at Dyersburg, Tenn., to increase its capacity from 12,000 to 25,000 ft. daily. James E. Stark & Co. recently purchased it. C. E. Somers, Memphis, will be manager.

Robert Hulme, 1162 Union Avenue, Memphis, is asking for information on machinery for the manufacture of guncotton.

Texas

AUSTIN, TEX., March 25, 1916.

The machinery and tool trade of Texas showed a material improvement this week over the week preceding. Good rains have fallen over most of the State and the protracted drought is broken.

The Studebaker Corporation, New York City, will install about $50,000 worth of machinery in the building it will erect at Dallas for an automobile assembling plant.

The Oakoal Mfg. Company, Austin, will rebuild its fuel manufacturing plant here that was recently destroyed by fire, entailing a loss of about $25,000.

The Houston Packing Company, Houston, has increased its capital stock from $500,000 to $800,000, and will enlarge its meat-packing plant.

The Chevrolet Motor Car Company, Flint, Mich., has closed a contract with the chamber of commerce of Fort Worth to construct an automobile assembling plant there to cost $600,000. It will have a capacity of 15,000 cars per year.

The Leon Irrigation Company, Fort Stockton, will install an irrigation pumping plant to water about 3000 acres of land.

A. C. Striegler, Menard, will install an irrigation pumping plant on the San Saba River to water about 100 acres of land.

M. L. Worman will build a saw-mill at Liberty. It will be about 25,000 ft. daily capacity. He will also construct a tramway.

Birmingham

BIRMINGHAM, ALA., March 27, 1916.

Wholesale machinery houses have been put to it to supply hydroelectric apparatus, owing to numerous changes from steam to electricity. Machine tools are in greater demand than can be supplied. The call for gasoline engines from rural sections is very strong. General business is quite good.

H. E. McCormack and George B. Tarrant, Birmingham, and others, have incorporated the Birmingham Inter-Urban Development Company, nominal capital $5,000, and propose to build an electric railway from Birmingham to Jasper, Ala. Ample capital is represented.

The Alabama Power Company, Birmingham, will enlarge its steam power plant at Decatur.

The American Machinery Company, Atlanta, has been incorporated by M. P. Martin and others with a capital stock of $5,000.

T. D. Massee, Macon, Ga., and others, have incorporated the Massee Mfg. Company to manufacture wooden handles, etc.

The St. Petersburg Lighting Company, St. Petersburg, Fla., will expend $75,000 for additional machinery to double its capacity. Specifications include a 1500-kw. steam turbine and a 50-kw. rotary converter.

The Peninsular Iron Works, Lakeland, Fla., incorporated with a capital stock of $25,000 by C. V. Turner, A. N. Erickson, and others, will build and operate a machine shop.

The ice and lighting plants at Clearwater, Fla., have been purchased by N. M. Seabreeze, Land Title Building, Philadelphia, and others, who plan to spend $25,000 in improvements.

The J. C. Bruton Stave & Lumber Company, Columbia, S. C., plans the expenditure of $200,000 in a plant for the manufacture of barrel staves for slack cooperage.

The Yaryan Rosin & Turpentine Company, Brunswick, Ga., announces that the plant which was destroyed with a loss of $500,000 will be rebuilt and re-equipped. In the meantime its business will be handled from the company's Gulfport, Miss., plant. Theodore Hemmelman, Jr., St. Louis, Mo., is president.

St. Louis

ST. LOUIS, MO., March 27, 1916.

Machine-tool business in this market continues up to the limit of delivery, with increasing pressure for equipment for extensions and new industries. The little relief from the pressure evident a few weeks ago has disappeared, and as much difficulty is found in getting equipment as at any time, with less relief than ever from the second-hand equipment source. Dealers have turned all their attention to the delivery problem and are letting orders come to them, instead of going after them. Collections are very good, money is easy and new investment funds are found readily available.

The Robinson Fire Apparatus Mfg. Company, St. Louis, Mo., has determined to extend its business to the manufacture of heavy-duty trucks and tractors and will install equipment for it.

The Panama Rubber Company, St. Louis, Mo., has doubled its factory space and will add equipment for the manufacture of motor accessories.

The Fred Campbell Auto Supply Company, St. Louis, Mo., has been incorporated with a capital stock of $125,000 by Fred Campbell, W. R. Comstock, W. L. Farrier, Jr., S. W. Campbell of Chicago and D. K. Campbell of Kansas City to manufacture automobile accessories.

St. Louis, Mo., has purchased one electric locomotive crane for its municipal dock and will buy several others as soon as specifications can be prepared, in order to assure delivery upon the completion of the dock now under construction.

The Federal Pure Water Company, St. Louis, Mo., has been incorporated with a capital stock of $100,000 by Joseph L. Kealty, William Preston Hill, William L. Moore, Joseph B. Kreikemeier, Silas B. Moser, Bernard Manoville and Frank L. Bartlett to manufacture electric machines for the purification of water.

The Funck Lumber Company, St. Louis, Mo., will equip a mill, 80 x 100 ft., four stories, for the manufacture of ready-cut houses.

The Potter Electric Signal & Mfg. Company, St. Louis, Mo., has been incorporated with a capital stock of $150,000 by C. E. Potter, Charles A. Powers and A. L. Potter and will equip a plant.

The Pioneer Auto Supply Company, Kansas City, Mo., has been incorporated with a capital stock of $60,000 by John F. Nordyke, R. Helburg, N. T. Haynes, and others, to manufacture automobile accessories.

The Noel Four Wheel Drive Mfg. Company, Kansas City, Mo., has been incorporated with a capital stock of $50,000 by Eusetta Noel, Edwin Daly, Frank Glatz, and others, to manufacture devices for driving automobiles, engines, etc.

The Great Western Smelting Company, St. Louis, Mo., is constructing an addition to its local plant which will increase its capacity about two and one-half times. A foundry building is included. It will continue to specialize in babbitt and other bearing metals, bronze ingots, brass ingots, type-metal alloys and solder, as well as other lines to be added. The company is also operating plants in Chicago, San Francisco, Seattle and Vancouver.

The Fulton Iron Works, St. Louis, Mo., has begun the enlargement of its plant, which is to cost about $125,000.

Charles A. Patterson, commissioner of public utilities,

Joplin, Mo., has had plans prepared for improvements to the electric light plant and system to cost $182,000.

Memphis, Mo., has voted $35,000 for the installation of an electric plant. David G. Fisher, Davenport, Iowa, is the engineer in charge.

Leo L. Brown, Kansas City, Mo., will equip a garage and machine shop and is reported in the market for about $4,000 worth of machinery, etc.

Risinger Brothers, Arkadelphia, Ark., will install an ice plant of 20 tons capacity.

The Standard Lumber Company, Pine Bluff, Ark., capital $100,000, has organized with R. Carnahan as president, W. C. Hudson vice-president, E. H. Elsberry secretary-manager and has acquired the J. M. Sanders mill, which it will improve.

The C. F. Liebke Lumber Company, St. Louis, Mo., through its manager, A. Hennen, at Helena, Ark., will equip mills at Secrest and Tucker, Ark., of 50,000 ft. of hardwood lumber a day capacity.

Rector, Ark., is receiving bids until April 11 for a waterworks pumping station, with oil-driven triplex pumps. Frank L. Wilcox, Syndicate Trust Building, St. Louis, Mo., is the engineer in charge. J. C. Rogers is chairman of the sewer commissioners.

The Melbourne Stave Company, Melbourne, Ark., will install stave-making equipment. J. B. Baker is in charge.

The Minnesota Electric Light & Power Company, Cushing, Okla., will install one 350-kw. three-phase, sixty-cycle, 2300-volt generator, direct connected to a Corliss engine.

The Paden Light & Power Company, Paden, Okla., will install a plant to cost about $10,000, and to develop about 50 hp. A. G. Rogers is president.

The Austin Bolt & Lock Nut Company, Oklahoma City, Okla., has been incorporated with a capital of $100,000 by T. A. and H. C. Austin, Wilburton, Okla.

The Fred Medart Mfg. Company, St. Louis, Mo., has placed a contract for the erection of a two-story factory addition to cost $35,000.

The Oklahoma Refining Company, Oklahoma City, Okla., will not equip a refinery at Ringling, Okla., but will establish a pumping station, etc. K. R. McKee is president.

The Oklahoma City Ice & Cold Storage Company, Oklahoma City, Okla., will equip an ice-making plant of 35 tons daily capacity.

The Interstate Compress Company's cotton compress at Hobart, Okla., has been burned with a loss of about $500,000, of which about $50,000 was on equipment, which will be replaced.

The city water department of Oklahoma City, Okla., announces that a water works plant to cost about $1,500,000 will be equipped. J. G. Street is commissioner.

The Planters Oil Mill & Gin Company, Kosciusko, Miss., is reported in the market for additional equipment, including tanks, cross compound condensing engine of 650 hp., and other machinery. J. O. Ashworth is purchasing agent.

The Mobile & Ohio Railroad Company will improve and enlarge the shops at Meridian, Miss., and increase the equipment for the repair of cars. B. A. Wood, Mobile, Ala., is chief engineer.

The Frieburg Lumber Company, Cincinnati, Ohio, will build and equip a plant at New Orleans for the manufacture of walnut furniture.

The Acadia Iron Works, Crowley, La., will install an independent electric plant for operating and lighting the works.

The Pacific Northwest

SEATTLE, March 21, 1916.

The largest order for construction lumber that has been placed in the Northwest for many years will be awarded in a short time by the Great Northern Railway. More than 30,000,000 ft. of lumber will be required in the construction of snowsheds in the Cascade Mountain division at a cost of over $1,500,000.

The car shortage situation is gradually being overcome. In Oregon it is stated the shortage has been reduced to 300 box cars. While the situation is not entirely satisfactory the railroads have done much to improve it, and within the next few weeks, when some of the cars now under construction have been completed, normal conditions will be resumed.

A new machine shop and garage has been opened in Reedsport, Ore., by Arthur Drews, machinist.

The Inland Empire Paper Company, Spokane, Wash., is planning to expend more than $250,000 in expansion of its plant at Millwood, east of Spokane. R. S. Talbot is general manager.

The Ford Motor Car Company of Canada has purchased a site in Vancouver, B. C., on which it will erect a four-story service and assembling plant. W. G. Patrick is Vancouver manager.

Charles R. McCormick & Co., Portland, has awarded to the St. Helens Shipbuilding Company, Portland, contract for a steam schooner, which will be 260 ft. long, with 44-ft. beam, and a carrying capacity of 1,500,000 ft. of lumber. This is the fourth vessel recently contracted for at the St. Helens plant.

The Merchants Central Heating Company, Spokane, Wash., announces that it will enter the electric field, and will construct a plant for that purpose to be in operation by Sept. 1.

Contract for addition to the Globe Iron Works, Tacoma, Wash., has been awarded to John Bean, Tacoma, contractor. The new addition will be occupied by the Pacific Boiler Company, which will move its plant from Seattle.

James W. Ford, Jr., city engineer, Florence, Ore., is receiving bids until April 9 for furnishing one duplex pump, capacity 200 gal. per min. against 150 ft. head; one oil engine, etc.

The Chicago, Milwaukee & St. Paul Railroad Company has announced through A. J. Earling, president, that the company will soon be in the market for construction of 1000 freight cars, in addition to the 1000 cars which are now being constructed.

The Municipal Lighting Department, Seattle, Wash., J. D. Ross, superintendent, has outlined preliminary plans for the construction of an addition to the city's Lake Union steam auxiliary plant in Seattle. It will have 13,000 hp. capacity, and will cost approximately $250,000. The building will be of reinforced concrete, costing about $20,000. Daniel Huntington, city architect, is preparing plans. Machinery will be purchased under direction of Superintendent Ross.

Announcement is made that the Wilson Mill Company, Aberdeen, Wash., will expend about $500,000 this year in the construction of two steamships and in making extensive improvements to its mill in Aberdeen. The vessels will be lumber carriers, 200 ft. long, with capacity of 1,200,000 ft. of lumber each, and will cost $150,000 each.

The Canadian Collieries, Ltd., with headquarters in Vancouver, is in the market for a fleet of three or four ships to handle its constantly increasing business with South American, Panama, United States, Pacific coast points and Honolulu, according to statement of Henry S. Fleming, chairman of the executive committee of the company, who has recently been in Seattle. He is empowered to immediately charter a ship of 8000 to 10,000 tons, which will be utilized until such time as the company can secure its own ships. It is understood the corporation expects to build its vessels as soon as shipbuilding approaches a lower figure.

The Nooksack Packing Company, Portland, Ore., capitalized at $100,000, has been incorporated by James T. Barron, Charles T. Whitney and M. J. Munley, all of Portland. Besides the canning business it will manufacture glue, fertilizer and other by-products.

Carl Fuller, Marshfield, Ore., is organizing a company for the construction of a cold-storage plant in that city.

Canada

TORONTO, March 27, 1916.

The Imperial Munitions Board announced that new orders for $7,000,000 worth of shells have been received at Ottawa this week, in addition to orders aggregating $20,000,000 received last week. The contracts will be awarded only to such companies as are in position to guarantee quick delivery, which it has been difficult to get heretofore. These munitions are needed not months hence, but as soon as they can be turned out; and therefore in these new contracts time limits will be imposed. Some orders have been placed; but the stipulation of early delivery operates to debar many firms seeking them. The orders cover all sizes of shells. Canadian shell manufacturers were summoned to Ottawa last week to devise ways and means for getting out larger quantities of shells more rapidly. The Government impressed upon the manufacturers the urgent necessity for this.

James Hardie, Hurdville, Ont., is in the market for a heavy three-saw edger, portable sawmill machinery and a 40-hp. boiler.

The Canadian Consolidated Rubber Company's plant at Papineau and Notre Dame streets, Montreal, was damaged $15,000 by fire.

The Standard Chemical Company, Thornbury, Ont., will build an addition to its plant and install two new ovens. The construction work will be started immediately.

The water and light commission, Collingwood, Ont., is in the market for pumping machinery, comprising two motor-driven units, 1000 gal. per min. capacity each, and other

equipment for the waterworks plant. Hugh A. Currie is chairman of the commission, and E. J. Stapleton is superintendent.

James Heyworth, Chicago, Ill., recently closed a deal whereby the Great Lakes Power Company, newly organized, will take over the power plant lately operated by the Algoma Steel Corporation at Sault Ste. Marie, Ont. Improvements and additions will be made, to cost about $3,000,000. Mayor McPhail, Sault Ste. Marie, is a director.

An addition will be built to the plant of the Belding-Paul-Corticelli, Ltd., Coaticook, Que., and new machinery installed.

The Alberta Farmers' Co-Operative Elevator Company, Lougheed Building, Calgary, Alberta, will build about thirty elevators in Alberta this summer.

The Toronto Hydro-Electric Commission, 226 Yonge Street, Toronto, will build additions and install machinery in its sub-stations on Junction Street, to cost $35,000, and to the Duncan Street station at a cost of $75,000.

A. Davis & Son, Ltd., Box 35, Kingston, Ont., is in the market for a gap lathe, 16 in. x 15 ft., to swing 30 in. in the gap, with countershaft, chuck, steady rest, compound rest and screw-cutting gear attached.

D. G. Dobson, Box 575, Midland, Ont., is in the market for a heavy duty gasoline or oil marine engine of 40 to 60 hp.

The Canadian Brush Machinery Company, Ltd., will establish a plant at Walkerville, Ont., to manufacture brush machinery, etc. W. G. Lieberg is president and W. Elsey manager and secretary.

Saskatoon, Sask., will build an addition to its power-house and install a rotary converter, etc.

The Gutta Percha Rubber Company will build a machine shop and garage on West Lodge Avenue, Toronto, Ont., to cost $18,000.

The Bonner Worth Company, Peterborough, Ont., will build an addition to its factory to cost $8,000.

Additions will be made to the waterworks plant at Lethbridge, Alberta, estimated to cost about $250,000. W. A. Stephens is city clerk.

The Keystone Bedding Company, Ltd., London, Ont., has been incorporated with a capital stock of $40,000 by William Agranove, Harry Rotenberg, Abraham Rosenfield, and others, to manufacture bed springs, metal beds, etc.

The Canadian Welding Works, Ltd., Montreal, has been incorporated with a capital stock of $10,000 by L. V. Miller and others.

G. P. Gonthier, St. George, Que., will build a steel foundry to cost $4,000.

The Foundry & Machine Company, Ltd., Montreal, has been incorporated with a capital stock of $200,000 by John J. Tolland, Joseph U. Emard, John A. Sullivan, and others, to manufacture machinery, tools, shells, motors, etc.

The Barr Registers, Ltd., Trenton, Ont., has been incorporated with a capital stock of $300,000 by Wilson Barr, William H. Matthews, John A. Stevenson, Trenton; Stephen F. Washington, Hamilton, Ont., and others, to manufacture metal castings, stampings, specialties, etc.

J. W. Oakes, Kathleen Street, Guelph, Ont., will soon commence the construction of a stove factory at Guelph to cost $7,000, for W. A. Mahoney, Telephone Building.

The Consumers Metal Company, Ltd., Montreal, has been incorporated with a capital stock of $40,000 by Henry R. Mulvena, Thomas B. Gould, Duncan Macdonald, and others.

The Acme Steel Goods Company of Canada, Ltd., Montreal, has been incorporated with a capital stock of $3,000 by James E. MacMurray, George C. Longman, Chicago, Ill., Jean J. Beauchamp, and others, to manufacture iron, steel, machinery, etc.

The Canadian Hardwoods, Ltd., Ottawa, has been incorporated with a capital stock of $150,000 by Charles Magee, John I. MacCraken, Harold E. McMahon, and others, to manufacture metal, furniture, railway cars, etc.

The Acme Tire & Rubber Company, Ltd., Toronto, has been incorporated with a capital stock of $400,000 by Joseph M. Bullen, of McMaster, Montgomery, Fleury & Co., 44 King Street West; Francis H. Hurley, 32 Aberdeen Avenue; Harold L. Steele, 437 Broadview Avenue, and others, of Toronto, to manufacture tires, rubber goods, etc.

The Universal Novelties, Ltd., Toronto, has been incorporated with a capital stock of $25,000 by Harry Riley, of Bain, Bicknell, MacDonell & Gordon, 6 Adelaide Street East; Thomas S. H. Giles, 249½ St. Helen Avenue; John F. MacGregor, 237 Beech Avenue, and others, to manufacture toys, metal goods, etc.

The Barton Feeders, Ltd., Hamilton, Ont., has been incorporated with a capital stock of $40,000 by L. F. Stephens, Hugh J. McKenna, William J. Lord, and others, to manufacture nails, horseshoes, carriages, etc.

Government Purchases

WASHINGTON, D. C., March 27, 1916.

Bids will be received at the Bureau of Yards and Docks, Navy Department, Washington, until 11 a. m., April 22, for furnishing one 60-kw. three-machine motor-generator set at the naval station, New Orleans, La.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, March 21, for supplies for the navy yards: Schedule 9333, steam engineering, class 11, for one foundry crane for—Bid A, San Francisco; B, New York City; C, f.o.b. works—Cleveland Crane & Engineering Company—A, $5,895; B, $5,515 and C, $5,445; Niles-Bement-Pond Company—A, $5,260; B, $4,850 and C, $4,825.

Bids were received by the general purchasing officer of the Panama Canal, Washington, D. C., March 17, under circular 1019, as follows:

Class 25, one plate-straightening roll—Bid 20, $6,880 and $6,380, 250 days; 33, $9,490, 210 days.

Class 26, one plate planing machine—Bid 20, $6,975, 250 days; 33, $8,445, 210 days; 41, $7,600, 305 days.

Class 27, one plate-bending roll—Bid 20, $21,950, 365 days; 33, $27,845, 240 days.

Class 28, one pipe-threading and cutting machine—Bid 23, $1,060, 190 days; 25, $699, 60 days; 27, $1,995, 95 days; 33, $1,895, 190 days; 45, $678, 70 days.

Class 29, one crank-slotting machine—Bid 27, $1,150 and $1,200, 105 days; 33, $970, 235 days.

Class 31, one wood-working sander—Bid 5, $1,619, 60 days; 14, $1,870, 30 days; 58, $1,954.52, shipment, 180 days.

The names of the bidders and the numbers under which they are designated in the above list are as follows:

Bid 5, American Woodworking Machinery Company; 14, J. A. Fay & Egan Company; 20, Hilles & Jones Company; 23, Kemp Machinery Company; 25, Manhattan Supply Company; 27, D. Nast Machinery Company; 33, Niles-Bement-Pond Company; 41, William Sellers & Co.; 45, Sidney B. Strouse; 58, P. B. Yates Machine Company.

NEW TRADE PUBLICATIONS

Recording Electrical Instruments.—Bristol Company, Waterbury, Conn. Bulletin No. 206. Deals with a line of recording electrical instruments. Illustrations and brief descriptions are given of various types of recording ammeters, wattmeters and voltmeters with references to the bulletin containing the complete description of each instrument.

Chain Hoists.—Chisholm-Moore Mfg. Company, Cleveland, Ohio. Catalog No. 24, fourth edition. Relates to an extensive line of chain hoists, trolleys and hand traveling cranes for all purposes, ranging in size from ¼ to 40 tons. Illustrations and brief descriptions of the various hoists are presented, together with lists of the sizes that can be supplied and dimension diagrams and tables. One of the features upon which special emphasis is laid is the use of a shock absorber with hoists built to handle material for trip hammers. Mention is also made of a complete line of hoists, trolleys, clamps, etc., for handling shells and other war material.

Arc Circuit Voltage Indicator.—General Electric Company, Schenectady, N. Y. Bulletin No. 46,023. Describes briefly an arc circuit voltmeter, which is a special instrument designed for testing direct-current series arc circuits. Dimension and connection diagrams are given, together with a table of the various voltages for which these instruments can be supplied.

Hydraulic Accumulators.—United Engineering & Foundry Company, Pittsburgh, Pa. Bulletin A. Pertains to a line of accumulators for all classes of service, which are built in the moving ram and moving cylinder types. A brief discussion of the various factors entering into the determination of accumulator capacity and instructions on installation are presented. A specification table for the sizes ordinarily built is included.

Cutting-Off Machine.—Southwark Foundry & Machine Company, 430 Washington Avenue, Philadelphia, Pa. Circular. Describes briefly and illustrates a cutting-off machine, which was illustrated in THE IRON AGE, Nov. 18, 1915. The machine, which is built for cutting round bars from 1 to 13 in. in diameter, is equipped with one or more heads, each consisting of three tools which are forced into the work by air pressure. The features upon which special emphasis are laid are minimum operating and maintenance costs and maximum production.

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